PROCEEDINGS

OF THE

MADRAS GOVERNMENT

IN THE

PUBLIC WORKS DEPARTMENT

IRRIGATION BRANCH,

FOR THE

MONTH OF JUNE 1890.

Printed by Authority.

MADRAS:
PRINTED BY THE SUPERINTENDENT, GOVERNMENT PRESS.

1890.

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GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

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PUBLIC WORKS DEPARTMENT,

IRRIGATION BRANCH.

PROCEEDINGS OF THE MADRAS GOVERNMENT,

FOR THE MONTH OF JUNE 1890.

Irrigation.
Account.

READ—the following papers :—

From Lieut.-Colonel S. C. CLARKE, R.E., Officiating Superintending Engineer, V Circle, to the Chief Engineer for Irrigation, dated Chepâk, 17th April 1890, No. 282.

As requested by the Collector of North Arcot in his letter No. 1711, dated 11th instant, I have the honor to submit for your sanction the enclosed estimate, Rs. 3,120, for repairing the bund and reconstructing sluice No. 1 of Kunnathur tank in Pólúr taluk.

2. The estimate has been classed under Original Work as per your endorsement No. 47 M., dated 7th February 1890, on the Collector's letter embodied in the Proceedings of the Board of Revenue, Mis. No. 1300, dated 26th idem.

3. As the work is to be carried out by this department, necessary funds, together with the charges for the supervision and tools and plant, will have to be placed at an early date at the disposal of the Executive Engineer.

From W. J. H. LE FANU, Esq., Collector of North Arcot, to the Secretary to the Commissioners of Land Revenue, dated Palmanér, 1st May 1890, Ref. on Genl. Eng. No. 1711.

With reference to Board's Proceedings, dated 26th February 1890, Mis. No. 1300, I have the honor to inform you that the Superintending Engineer, V Circle, was requested to send the estimate for the repair of Kunnathur tank to the Chief Engineer for Irrigation.

2. As the grant sanctioned for this district has already been distributed (*vide* my letter, Reference on Board's No. 256 of 1890, dated the 24th instant), I request that the estimate amount, viz., Rs. 3,200, together with the supervision charges, viz., Rs. 784, may be met from the reserve at the disposal of the Board, and arrangements made for placing the amount at the disposal of the Public Works Department at an early date. Major Rawson is pressing me for funds, and it is urgent that the work should be done before the rains.

Reference, dated 12th May 1890, No. 1497 (Land Revenue).

The Chief Engineer for Irrigation is requested to inform the Board if the estimate for the work referred to has been sanctioned by him.

(Signed) M. HAMMICK,
Secretary.

No. 78 I.

Submitted to Government.

Ootacamund,
22nd May 1890.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Acting Secretary to Government,
Public Works Department.

Order—dated 3rd June 1890, No. 313 I., Public Works.

The following estimate is sanctioned:—

Irrigation.
43. Minor Works and Navigation.
Irrigation and Navigation.
Works for which neither Capital nor Revenue Accounts are kept.
North Arcot Division.
"Minor" Irrigation Work.
Original Works.

	RS.
Repairing the bund and reconstructing sluice No. 1 of Kunnathur tank, estimate	3,080

2. This sanction has been registered as No. 24 I. of 1890-91.

3. Funds for the execution of the work will be provided from the grant placed at the disposal of the Board of Revenue for repairs to Minor Irrigation Works under the charge of the Revenue Department.

(True Extract.)

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation.
" Superintending Engineer, V Circle, with eight enclosures.
" Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.
ACCOUNT.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated June, 3rd.

Recd. *Encl.*

G.O., 3rd June 1890, No. 313 I.

JUNE.

Kunnathur Tank, North Arcot Division

Estimate of Rs. 3,080 for repairing the bund and reconstructing sluice No. 1 of the —, sanctioned.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.

Read—the following paper :—

Proceedings of the Board of Revenue (Land Revenue), dated 9th May 1890, Mis. No. 2890.

Abstract.—Submitting for publication draft notification for acquisition of land required for the restoration of Cheyár embankment in Cuddapah district.

No. 3030, Revenue.

Transferred to the Public Works Department (Irrigation Branch).

Ootacamund,
16th May 1890.

(Signed) C. A. GALTON,
Secretary to Government.

Order—dated 3rd June 1890, No. 314 I., Public Works.

Ordered that the notification be published in the *Fort St. George Gazette.*

(True Extract.)

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation.
" Superintending Engineer, III Circle.
" Revenue Department.

IRRIGATION.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated June, 3rd.

Recd. *Encl.*

G.O., 3rd June 1890, No. 314 I.

JUNE.

Land

Ordered that the notification for the acquisition of — required for restoring the Cheyár embankment in the Cuddapah district be published in the *Fort St. George Gazette.*

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Account.

READ—the following paper :—

From Lieutenant-Colonel S. C. CLARKE, R.E., Officiating Superintending Engineer, V Circle, to the Chief Engineer for Irrigation, dated Chepâk, 10th April 1890, No. 122.

I have the honor to forward, for your sanction, the marginally-noted estimates, amounting in aggregate to Rs. 12,880, for improving Random tank of the Pálár anicut system in North Arcot district.

	RS.
1. Repairs to Random tank bund, estimate ...	9,400
2. Constructing a sluice to Random tank bund, estimate	780
3. Constructing a weir to Random tank bund, estimate	2,700
Total ...	12,880

2. These estimates are very large as compared to the revenue derived from the tank, but as it is the main reservoir and distributor of water to several groups of tanks, which are mentioned in the Assistant Engineer's report, it is of vital importance that this work of repair now estimated for may be sanctioned at an early date.

ENCLOSURE.

REPORT to accompany the estimate for the repair of Random Tank.

Amounts of estimates are as follows :—

	RS.
Repairs to bund	8,400
Constructing a sluice	820
Constructing a weir	2,380
Total ...	11,600

Random tank forms what used to be two tanks, viz., Random large tank and Random Chitteri tank. It is Nos. 28 and 29, page 14 of the list of component parts, Pálár Anicut System, Southern Section. This estimate is very large when compared with the revenue under the tank, but the tank is a very important one, being the main reservoir and distributor to several groups of tanks. From Random tank the following are supplied—Nagantangal (Nayantangal) acres 115; Tandappantangal acres 75; Perumantangal acres 14; Vadamanapakkam acres 241; Perungathur acres 521; Kunnathur acres 475; Kahanam acres 407; Sittathur acres 271; Hasanamapetta Aratirivellur acres 342; Melapuderi acres 71; Pullapakkam acres 176; Moranam acres 159, or a total of 2,867 acres in addition to its own cultivated area of 268 acres. The tank is thus a very important one and distributes the supply received from the Mecheri branch of Tennampettu (Dusi) channel. This estimate provides for raising the bund and revetment and constructing a new sluice and weir. This weir has been given vents to discharge 182 cubic feet per second of river water to down tanks which is the allowance of water for the Nayantangal group of tanks as per G.O., dated 13th June 1884, No. 561 I. The acreages now given under the various tanks differ from those on page 34 and 35, G.O., dated 13th June 1884, No. 561 I., but the reason for this is that Hissa tanks irrigating lands in several villages were not taken into account. For instance, Kahanam tank irrigates lands in three villages, Hasanamapetta in four villages, though these have not been taken into account. The figures now given are according to the descriptive memoirs of the Arcot taluk and represent the area capable of being irrigated, and it is for the purpose of irrigating these lands that the project estimates were sanctioned and such a large supply of river water allowed. The sketch-map of the Pálár Anicut System, Southern

Section, shows Random tank as two separate tanks, but this is not actually the case as the bund is continuous and the only surplus weir is in the bank of the so-called Chitteri tank.

It is requested that this estimate, if approved, may be sanctioned under Major Works as there is no chance of carrying it out from the ordinary grant under Revenue Maintenance and Repairs.

(Signed) F. W. ASHPITEL,
Assistant Engineer, Vellore Sub-division.

10th December 1889.

(Signed) C. C. RAWSON, Major, R.E.,
Executive Engineer, North Arcot Division.

23rd December 1889.

No. 79 I.

Submitted to Government.

2. The estimates as modified in this office amount to Rs. 11,600 and are recommended for sanction.

OOTACAMUND,
27th May 1890.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Acting Secretary to Government,
Public Works Department.

ORDER—dated 4th June 1890, No. 315 I., Public Works.

The following estimates are sanctioned:—

Irrigation.
43. Minor Works and Navigation.
Irrigation and Navigation.
Works for which Capital and Revenue Accounts are kept.
Pálár Anicut System.
Revenue Account.
Southern Section.
(3) Distributaries.
Random Tank.
Extensions and Improvements.
C. Works.

	RS.	RS.
1. Constructing a weir	2,380	
2. Constructing a sluice	820	
		3,200
Maintenance and Repairs.		
L. Earthwork.		
3. Repairing and improving tank		8,400
Total ...		11,600

2. This sanction has been registered as No. 25 I. of 1890-91.

(True Extract.)

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation.
„ Superintending Engineer, V Circle, with fourteen enclosures.
„ Examiner, Public Works Accounts.
„ Revenue Department.

IRRIGATION.
ACCOUNT.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated June, 4th.

Encl.

Recd.

G.O., 4th June 1890, No. 315 I.

JUNE

Random Tank, North Arcot District

Estimate, amounting to Rs. 11,600, for carrying out repairs and improvements to the —, sanctioned.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Account.

READ—the following paper:—

From J. HANNAN, Esq., Superintending Engineer, II Circle, to the Chief Engineer for Irrigation, dated Bezváda, 19th April 1890, No. 202 K.S.

I have the honor to forward, herewith, for your approval and sanction, an estimate, amounting to Rs. 3,510, for improvements to Nakkavagu outlet, 23 miles 60 chains of Commamur canal.

2. This work can be met from the saving effected, as explained in the accompanying report, by giving up the inlet 1,800 feet long, for which Rs. 3,770 was allowed in the project (G.O., No. 797 I., dated 9th October 1882), as the banks are not kept up on the right side of the canal—please see para. 30 of G.O., No. 321 I., dated 21st March 1884, the saving effected being credited to unforeseen works.

ENCLOSURE.

REPORT on lengthening Nakkavagu Outlet.

The estimate has been prepared in accordance with the Chief Engineer for Irrigation's instructions in para. 30 of his inspection notes for 1884 printed with G.O., No. 321 I., dated 21st March 1884, which are as follows: "I would also lengthen the outlet by 1,000 feet, which can be done from the saving effected by giving up the inlet which is not wanted; this work should be carried out as early as possible." The present outlet is 1,800 feet long and is at 23 miles 60 chains, the late floods of this year prove that there is no doubt that it is necessary to lengthen the outlet.

(Signed) J. E. PAUL,
Executive Engineer, Kistna Western Division.

20th December 1889.

ORDER—dated 5th June 1890, No. 316 I., Public Works.

The following estimate, amounting to Rs. 3,540, for lengthening the Nakkavagu outlet, 23 miles 60 chains of the Commamur canal, Kistna Western Delta, is sanctioned, the amount required to cover the proposed outlay being met from the provision of Rs. 3,770 made for the "Nakkavagu *inlet*" which is not now wanted in the classified abstract estimate * printed in P.M.G., No. 577 I., dated 1st October

* *Vide* item 971.

1888. The net saving of Rs. 230 will be added to the amount reserved for unforeseen works which will then be increased to Rs. 2,09,347 :—

Capital Expenditure not charged to Revenue.
49. Irrigation.
Kistna Delta System.
Western Section.
I. Works.
Commamur Canal.
(2) Main Canals and Branches.
F. River and Hill Torrent Works.

Lengthening the Nakkavagu outlet. Estimate ... ... Rs. 3,540

2. This sanction has been registered as No. 26 I. of 1890-91.

(True Extract.)

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation.
" Superintending Engineer, II Circle, with four enclosures.
" Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.
ACCOUNT.

Govt. of {1889} Madras.

PUBLIC WORKS.

Dated June, 5th.

Recd. *Encl.*

G.O., 5th June 1890, No. 316 I.

JUNE

Nakkavagu Outlet

Estimate of Rs. 3,540 for lengthening the — of the Commamur Canal, Kistna Western Delta, sanctioned with remarks.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Account.

READ—the following paper :—

From H. H. O'CONNELL, Esq., Executive Engineer, Nellore Division, to the Superintending Engineer, II Circle, dated Nellore, 6th May 1890, No. 42.

I have the honor to request that you will be pleased to obtain an appropriation of Rs. 3,900 for the work improving the Manubolupad tank, estimate Rs. 3,970, sanctioned in G.O., No. 230 I., dated 12th April 1890.

2. Funds may be obtained by transfer from the Divisional Repair grant of Rs. 80,000 for the current year for 43. Minor Works and Navigation Works for which neither Capital nor Revenue Accounts are kept.

3. I have called for tenders for the work in anticipation of allotment of funds.

No. 111 N.L.

Copy submitted to the Chief Engineer for Irrigation for favor of necessary transfer of funds as applied for in the foregoing letter.

(Signed) J. HANNAN,
Superintending Engineer, II Circle.

21st May 1890.

ORDER—dated 6th June 1890, No. 317 I., Public Works.

The following transfer of funds is sanctioned :—

Irrigation.
43. Minor Works and Navigation.
Irrigation and Navigation.
Works for which neither Capital nor Revenue Accounts are kept.
Nellore Division.

From	RS.	*To*	RS.
		Original Works, Major.	
Repairs	3,900	Manubolupad tank improvements ...	3,900

(True Extract.)

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation.
" Superintending Engineer, II Circle.
" Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.
ACCOUNT.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated June, 6th

Recd. *Encl.*

G.O., 6th June 1890, No. 317 I.

JUNE.

Transfer of Funds

Sanctioning certain —.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.

READ—the following papers :—

From R. G. MACDONALD, Esq., Officiating Deputy Secretary to the Government of India, Public Works Department (Account—Irrigation), to the Secretary to the Government of Madras, Public Works Department, dated Simla, 20th May 1890, No. 53 A.I.

In acknowledging the receipt of the final issues of the budget estimates of the Irrigation Branch, Madras, for 1890-91, I am directed to state that in page 6 of the budget estimate of Major Irrigation Works the amount of the sanctioned estimate for the Sangam anicut system has been shown as Rs. 30,00,000, whereas the amount sanctioned by the Government of India in Public Works Department letter No. 100 I., dated 23rd May 1889, is Rs. 30,65,000. The difference is apparently due to the Government of Madras having credited to Capital the sale-proceeds of certain tank-beds, which, under the orders issued with Public Works Department Resolution No. 53 A.I., dated 20th June 1889, should no longer be treated as receipts on Capital account. Unless para. 5 of the Resolution referred to is applicable to the present case, the amount of the estimate sanctioned by the Government of India should be adopted in future estimates and accounts.

2. I am also to state that in appendix A the grants for, and the outlay on, the Rushikulya project should be shown in the column headed "Capital expenditure charged to Revenue" instead of in the column "Capital expenditure not charged to Revenue."

3. The necessary corrections have been made in the copies of the budget estimate received in this office.

From the Superintending Engineer, VI Circle, dated 20th May 1890, No. 364 T.J.

ORDER—dated 7th June 1890, No. 318 I., Public Works.

Erratum in Proceedings of the Madras Government, No. 263 I., dated 2nd May 1890, and the final issue of the Irrigation budget estimates appended thereto :—

	For	*Read*
Proceedings of the Madras Government, Note by Chief Engineer for Irrigation, para. 9, line 2	"VI Circle."	"V Circle."
Proceedings of the Madras Government, Note by Chief Engineer for Irrigation, para. 16, line 18	Velnaraiyankulam.	Vilvarayankulam.
Major Works Budget.	RS.	RS.
Page 16, column 2, Sangam anicut system.	30,00,000	30,65,000
Page 28, expunge the figures against Rushikulya project in column 2 and enter them in column 3.		
Minor Works Budget.		
Part II, page 10, item 23, column 1 ...	"Do."	"Tinnevelly."
Do. do. item 33	"Velnarayankulam."	"Vilvarayankulam."

(Here enter No. 319 I., dated 7th June 1890.)

(True Extract.)

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation.
„ Chief Engineer, Periyár Project.
To Superintending Engineers.
To the Examiner, Public Works Accounts.
„ Revenue Department.
„ Financial „

ENDORSEMENT—dated 7th June 1890, No. 319 I., Public Works.

Copy of the above forwarded to the Government of India.

(By Order.)

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

IRRIGATION.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated June, 7th.

Recd. *Encl.*

G.O., 7th June 1890, Nos. 318 I., 319 I.

JUNE.

Erratum

In the final issue of the Irrigation budget estimates for 1890-91.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.

READ—the following paper :—

NOTES of discussion at a Conference held at Ootacamund on Saturday, 10th May 1890, to consider pending irrigation disputes between Madras and Mysore.

The following gentlemen were present :—

1. Sir *Oliver St. John*, K.C.S.I., R.E., Resident in Mysore.
2. Hon'ble Mr. *H. E. Stokes*, C.S.I., Member of Council, Madras.
3. Mr. *S. Seshadri Iyer*, C.S.I., Dewan of Mysore.
4. Colonel *Bowen*, R.E., Chief Engineer, Mysore.
5. Mr. *G. T. Walch*, Chief Engineer for Irrigation, Madras.

Sir *O. St. John* was requested to preside.

The *Dewan* proposed to proceed to the consideration of the cases pending, but Mr. *Stokes* observed that in the correspondence certain pretensions had been put forward on the part of Mysore to the effect that she is entitled to do as she pleases with all water falling in or flowing through her territory ; that these pretensions amounted to an absolute negation of all rights on the side of Madras to drainage from Mysore ; that if they were maintained there was no basis for discussion ; that if, however, it was admitted that Madras has such rights, it might be possible to agree on the principles of a *modus vivendi*, which would on the one hand allow to Mysore reasonable freedom in dealing with her irrigation works, and on the other give to Madras practical security against injury to her interests ; and that if such principles were agreed on, the particular disputes which have arisen could be easily settled in accordance therewith.

The *Dewan* stated that the assertions of Mysore rights alluded to were assumed as the basis of the programme for the restoration of its irrigation works which was inaugurated during the British administration of Mysore and which alone the present Government of Mysore was engaged in carrying out. He read certain passages from Colonel Sankey's papers to the effect that the aim of the operations should be to use up the whole of the rainfall running off the ground, and observed that the scheme in its entirety had been approved at the time by the Government of India. He assumed that this would not have been done if the scheme had trenched on British interests, and considered that the Madras Government was bound by that approval and was not at liberty now to dispute anything that might be done in working out Colonel Sankey's scheme.

Mr. *Stokes* observed that the passages quoted merely affirmed a general *desideratum* in such operations; that it did not appear that the effect of his principles or proposals on Madras works was ever considered or thought of by Colonel Sankey; that the Government of India in approving the scheme probably regarded only Mysore interests for which they were at the time responsible; and that in any case the Madras Government, which had no knowledge of the scheme and was neither heard nor consulted in regard to it, could not in such circumstances be held bound by the decision upon it. He said that one of the objects which Madras has now in view is to secure information of projects undertaken by Mysore which may injuriously affect Madras works in order that objection may be urged in due time.

Mr. *Walch* pointed out that it was in the interest of Mysore itself that such information should be given, so that objection, if any existed, might be disposed of before money was spent.

Sir *Oliver St. John* expressed his opinion that the assertion of unlimited right by Mysore was extreme and untenable, and that the approval of the Government of India accorded to the Mysore programme was in no way conclusive of the question as against Madras.

After some argument the *Dewan* stated his position as follows:—Mysore has a natural right to the full use of all the water in its territory, but such natural right is limited by the rights to supply which have been acquired by prescription on behalf of works in Madras. In exercising its natural right, Mysore may do anything which does not injuriously affect the enjoyment of its acquired rights by Madras, or materially diminish the supply to Madras works. The Madras rights extend only to the supply which has been actually turned to account for irrigation. All the rivers flowing from Mysore into Madras pour an unused surplus into the sea. Mysore may intercept and take measures to utilize such surplus, and in view to its interest in it and to preventing the growth or enlargement of the Madras prescriptive rights may as well claim to be informed of and object to new works constructed in Madras for utilizing the river flow as Madras may in regard to what is being done in Mysore.

Mr. *Stokes* said that he was not concerned to dispute the description of the nature and origin of the rights of Mysore and Madras given by the *Dewan;* but he demurred to the word "materially" as qualifying diminution of supply to Madras works, holding that no such diminution is permissible. He refused to admit that the Madras rights to the flow in the rivers was limited to the amount actually turned to account for irrigation, and contended that Madras is entitled by prescription to the whole flow allowed to pass the frontier, at which point Mysore loses all right or interest in it.* All considerations of this sort were, however, abstract, and it was impossible to base practical rules upon them, or to adjust rights with such nicety.

The *Dewan* as an illustration of his meaning as to material diminution took the case (now in dispute) of the tank proposed to impound the head-waters of the Chitrávati which feeds the Madras tank of Bukkapatnam. The *Dewan* stated that the whole drainage area of the river in Mysore is 581 square miles and in British territory above Bukkapatnam 850 square miles.† The drainage area of the new tank is to be 48 square miles, and he did not consider that interception of this quantity of drainage was a material interference with the supply of the Bukkapatnam tank 50 miles down the river.

Messrs. *Stokes* and *Walch* dissented. Assuming the rainfall throughout the whole area from which the Bukkapatnam tank is supplied is uniform, the diminution on the

* It might also have been pointed out with regard to the unused surplus which flows to the sea that to claim it, or part in it, Mysore would have to show that it was Mysore water which thus run to waste; and that in the case of all the rivers the drainage area and run off within Madras territory is vastly greater than within Mysore limits.

† These figures are the Dewan's and are not accepted as correct. The Executive Engineer, Bellary, gives corresponding figures 330 and 250 square miles. Scaled from the atlas sheet 325 and 230 square miles are obtained. The abstraction of 48 square miles of drainage is therefore a much more serious encroachment on the Bukkapatnam supply than the Dewan's figures show.

Dewan's showing is $\frac{48}{1431}$ more than 3 per cent. of the whole supply of the tank and more than 8 per cent. of the supply derived from Mysore; and considering that the tank rarely surpluses, such diminution is very material; as a fact, the rainfall at Bukkapatnam may be taken at 17 inches per annum, whereas Colonel *Bowen*, it is stated, calculated it at 24 inches at the site of the new tank.

Asked what was the nature of the restrictions upon Mysore action which the Madras representatives would propose, they propounded the rules given in the margin. They said these were put forward mainly as a basis for discussion and as indicating the nature of the securities considered necessary in the interests of Madras. They regarded the restriction on the construction of works to divert or store the waters of the main rivers named as of special importance. As to the 100 acre limit on new works in the frontier zone it might seem low, but it was to be remembered that the Madras works in the neighbourhood were as a rule small and that the abstraction of supply for 100 acres might in some cases mean the complete annihilation of a Madras tank.

(1) Works which have been disused for twenty years and upwards to be considered to have been abandoned and any restoration of them to be considered as new work.

(2) Repairs or restoration of works which have not been abandoned for more than twenty years will not be objected to provided the area to be irrigated does not exceed the highest actual cultivation in previous years.

(3) New works to irrigate more than 100 acres within 30 miles of the frontier measured along the stream dealt with from where it, or the river it falls into, crosses the frontier, or if beyond that distance to irrigate more than 200 acres for any individual work or more than 500 acres for any group of works in the same basin, not to be allowed without consent of the Madras Government.

(4) No anicuts to be built or reservoirs formed on the rivers named below:—

Tunga.
Bhadra.
Tungabhadra.
Vedavatti or Hagiri.
Chitràvati.
Pàpaghni.
Pennér.
Pàlàr.
Ponniár.
Arkavati.
Shimsha.
Hennavatti.
Honhalli.
Cubbani.
Lechmantirta.
Tala Cauvery.
Cauvery.

Sir *Oliver St. John* observed that the apparent meaning of the rules was that objection might be taken on the grounds stated to Mysore operations, and that any objection made would have to be discussed and if necessary settled by arbitration or reference to the Government of India or in some such way.

The *Dewan* said that the list of rivers included all those flowing out of Mysore and most of those in it, and was altogether too extensive. Mr. *Stokes* stated that the list was designedly drawn up to include all the chief rivers and their most important tributaries, especially those of the Cauvery, the supply of which is vital to Madras. He was willing, however, to strike out the Shimsha and the Arkavati streams which, though draining a large area in the central part of Mysore, were comparatively unimportant as feeders of the Cauvery. It was impossible, however, to consent to free use by Mysore of the water of the other tributaries which draw their supply from the Western Ghâts and several of which drain even larger areas than the main river.

The *Dewan* considered the proposed rules as altogether unacceptable and in excess of anything which Mysore could agree to. He was not prepared to advance any alternative proposals.

As it was evident that there was no prospect of agreement in regard to any part of the subject, the Conference broke up with an understanding that each side should state its case for the consideration of the Government of India.

Ootacamund,
12th May 1890.

(Signed) H. E. STOKES,
Member of Council, Madras.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

ORDER—dated 11th June 1890, No. 323 I., Public Works.

Ordered that the Government of India be addressed

(Here enter No. 324 I., dated 11th June 1890.)

(True Extract.)

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation, with copy of letter.

IRRIGATION.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated June, 11th.

Recd. *Encl.*

G.O., 11th June 1890, No. 323 I.

JUNE.

Irrigation disputes between Madras and Mysore.

Ordered that the notes of discussion at a Conference held at Ootacamund to consider pending — be forwarded to the Government of India.

PUBLIC WORKS DEPARTMENT.

Irrigation.

LETTER—from

G. T. WALCH, ESQ.,

Acting Secretary to the Government of Madras,
Public Works Department,

To

THE SECRETARY TO THE GOVERNMENT OF INDIA,
PUBLIC WORKS DEPARTMENT.

SIR,

I am directed to forward, for the consideration and orders of the Government of India, the accompanying copy of the Proceedings of this Government, No. 323 I., dated 11th June 1890, embodying notes of discussion at a Conference held at Ootacamund on the 10th May 1890 to consider pending irrigation disputes between this Government and the Mysore Durbar.

2. I am to say that the Governor in Council considers it of very great importance to the interests of Madras irrigation works that some general principles should be arrived at as to the extent to which the Mysore Government may divert to its own purposes water which now flows to Madras territory and feeds works therein. The disputes actually pending are not unimportant, but the injury done to the works concerned is as nothing compared to what might accrue if the Mysore Government, which it is believed is engaged in active prosecution of schemes for the improvement of its irrigation works, were to store or divert the waters of the larger rivers which on almost all sides flow from the Mysore plateau to Madras territory. It will be seen that even with regard to the disputes actually on hand the attitude of the Mysore Durbar is such as to preclude all hope of their yielding due consideration to Madras interests. I am therefore to solicit the interference of the Government of India in bringing such pressure to bear on the Durbar as will secure the interests of Madras.

I have the honor to be,
Sir,
Your most obedient servant,

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

OOTACAMUND,
11th June 1890.

IRRIGATION.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated June, 11th.

Recd. *Encl.*

11th June 1890, No. 324 I.

JUNE.

Irrigation disputes between Madras and Mysore

Forwarding for consideration notes of discussion at a Conference held at Ootacamund to consider pending —.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Ir igation.

READ—the following paper:—

From Lieut.-Colonel A. C. SMITH, R.E., Superintending Engineer, VI Circle, to the Chief Engineer for Irrigation, dated Kodaikánal, 19th May 1890, No. 355 T.J.

Under para. 1339 of the Public Works Code, I have the honor to request sanction of Government for execution by this department of the contribution work of constructing two drainage sluices and an irrigating one in the new left bank of Corayar in Veeranvayal limits.

2. The sluices are intended for the drainage and irrigation of lands in the Veeranvayal village belonging to Ramaswaram Devastanam.

3. The plan and estimate have been countersigned by the District Judge, Madura, as trustee of the temple.

4. The estimate amounts to Rs. 2,025; this, together with Rs. 496, the centage for establishment and tools and plant, has been promised to be contributed by the manager of the devastanam.

5. The plan and estimate are herewith submitted for the sanction of Government.

6. The execution of the estimate of Rs. 4,060 for forming a new left bank to Corayar was undertaken by this department on G.O., No. 536 I., dated 2nd November 1889.

No. 80 I.

Note by the Chief Engineer for Irrigation.

Sanction of Government to the execution of the works by this department is recommended.

2. An improvement in the form for the wings of the drainage sluices to obviate the eddy which probably would be caused by the awkward projections in the design for carrying the platform beam stones is shown in dotted red lines.

OOTACAMUND,
3rd June 1890.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Acting Secretary to Government,
Public Works Department.

Order—dated 13th June 1890, No. 326 I., Public Works.

The execution by this department of the works referred to is sanctioned.

(True Extract.)

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation.
" Superintending Engineer, VI Circle, with four enclosures.
" Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.

Govt: of {1890} Madras.

PUBLIC WORKS.

Dated June, 13th.

Recd. *Encl.*

G.O., 13th June 1890, No. 326 I.

JUNE.

Drainage Sluices

The construction by the Public Works Department of — and an irrigating sluice in the new left bank of Corayar in Veeranvayal limits, sanctioned.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Account.

READ—the following paper: —

From R. G. MACDONALD, Esq., Officiating Deputy Secretary to the Government of India, Public Works Department (Account—Irrigation), to the Secretary to the Government of Madras, Public Works Department, dated Simla, 5th May 1890, No. 49·A.I.

In acknowledging receipt of the statement showing the work done and revenue realized in connection with the Tank Restoration Scheme in Madras during and to end of 1888-89 forwarded with your endorsement No. 168 I., dated 13th March 1890, I am directed to inquire whether it would be possible, without much trouble, to give in columns 6 and 9 of that statement the outlay on investigation and repairs for the works which have been completed, and from which land is being irrigated, and revenue realized, as shown in columns 13, 14 and 15 of the same statement.

2. If this is not possible, the actual expenditure on the restoration of such works in column 9, and a reliable approximation of the share appertaining to them of the cost of investigation in column 6 might be given, as without some such figures the true financial result of the Tank Restoration work cannot be ascertained.

ORDER—dated 14th June 1890, No. 327 I., Public Works.

Ordered that the following letter be sent to the Government of India.

(Here enter No. 328 I., dated 14th June 1890.)

(True Extract.)

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation.

IRRIGATION.
ACCOUNT.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated June, 14th.

Recd. *Encl.*

G.O., 14th June 1890, No. 327 I.

JUNE.

Tank Restoration Scheme

Ordered that the Government of India be informed that it is not possible to arrive at the portion of the outlay on investigation due to individual works or even groups of works under the —.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Account.

Letter—from

G. T. WALCH, Esq.,
Acting Secretary to the Government of Madras,
Public Works Department,

To

The SECRETARY to the GOVERNMENT of INDIA,
Public Works Department.

Sir,

I am directed to acknowledge the receipt of your letter No. 49 A.I., dated 5th May 1890, and to say that His Excellency the Governor in Council does not consider it possible to arrive at the portion of the outlay on investigation due to individual works or even groups of works under the Tank Restoration Scheme; nor could any reliable approximation be made now or until much more time has elapsed from the commencement of work and many more works have been carried out, because, as explained in para. 4 of the "Note" by the Chief Engineer for Irrigation which accompanied my letter No. 295 I., dated 21st May 1890, the cost of investigation now stands at an abnormally high percentage which is being considerably reduced as work progresses.

I have the honor to be,
Sir,
Your most obedient servant,

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

Ootacamund,
14th June 1890.

IRRIGATION.
ACCOUNT.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated June, 14th.

Recd. *Encl.*

14th June 1890, No. 328 I.

JUNE.

Tank Restoration Scheme

Informing that it is not possible to arrive at the portion of the outlay on investigati on due to individual works or even groups of works under the —.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Account.

Read—the following papers :—

Proceedings of the Board of Revenue (Land Revenue), dated 18th March 1890, No. 157.

Mr. H. W. Bliss.

Read—the following letter from H. SEWELL, Esq., Collector of South Arcot, to the Secretary to the Commissioners of Land Revenue, dated 5th October 1888, Reference on D.C.R. No. 1564 :—

I have the honor to request that you will be good enough to obtain the sanction of Government, in the Public Works Department, for the payment of a sum of Rs. 2,987-14-11 as compensation for the lands submerged by the Nagarapadi tank, Chidambaram taluk, in consequence of that tank, formerly a rain-fed one, receiving a larger supply from the Pelandorai anicut since 1877.

2. In May 1884 the Executive Engineer intimated that lands to the extent of cawnies 65 in the villages of Venkatasamudram and Nagarapadi, included in the waterspread of the said tank, would be submerged owing to certain improvements to be executed thereto, viz., the erection of cross and protecting bunds to confine its waterspread within fixed limits, and asked for a valuation of the lands to enable him to include the amount in the estimate which had been prepared in February 1883 and was ready to be sent to the Superintending Engineer for sanction. The valuation was furnished to him in the same year, but in April 1886 he informed the Collector that the estimate had not been sent in and that his department had no idea of effecting any improvements to the tank in question. On receipt of this communication, the Sub-Collector, Mr. Horsfall, who was then in charge of the district, informed the Head Assistant Collector that the pattadars might be allowed to cultivate the lands reserved for the waterspread pending further requisition by the Public Works Department. The Head Assistant Collector seems to have thereon issued an order, since cancelled, that the remissions till then allowed on such of the lands as were prevented by flooding from being cultivated would no longer be granted. Agitated by this order the ryots concerned began to pour in petitions pressing for compensation.

3. As the cross and protective bunds have been abandoned, it is reported that the lands in Venkatasamudram village are out of danger and therefore need not be compensated for. But in Nagarapadi acres 32·37 of patta land and acres 9·18 of inam land have been submerged by the extension of the waterspread and have not been cultivable since fasli 1289.

	RS.
Ayen, dry	25
Do. wet	65
Inam, wet	75

4. Compensation has been settled at the marginally-noted rates per acre which are fair, and I beg to recommend that they may be accepted.

5. Two of the ryots concerned claim in addition refund of the cesses paid by them on the lands submerged, as well as compensation for loss of cultivation from fasli 1289, or, as an alternative, Rs. 5 an acre in commutation of both the claim. I would reduce the claim into one of interest on the value of their lands now recommended to be paid to them and accordingly fix it at 5 per cent. thereon. This would come to Rs. 365-0-3.

Reference on the above, dated 26th October 1888.

It is not clear how the submersion was caused, and whether the extension of the waterspread referred to in paragraph 3 is due to the increased supply mentioned in paragraph 1, or whether it is due to the capacity of the tank having been enlarged. If the latter, it should be stated what work was executed and when; and if the former, it is not clear to what the increased supply is due. With reference to paragraph 2, it should be reported whether the lands were in private holding at the time of the receipt of the intimation in 1884 from the Executive Engineer that 65 cawnies would be submerged, and if not, if any order was issued prohibiting the ryots from cultivating the lands, and if the renewed permission to cultivate was saddled with any conditions made by the Engineer. The Collector is also requested to forward a plan of the tank showing the former and the present waterspread, and the lands said to be submerged, together with a statement showing more in detail how the amount of compensation proposed was arrived at.

(Signed) H. A. SIM,
Acting Secretary.

To the Collector of South Arcot.

Read—the following letter from H. SEWELL, Esq., Collector of South Arcot, to the Secretary to the Commissioners of Land Revenue, dated Pondicherry, 21st May 1889, Reference on Board Recd. No. 1290 :—

In reply to Board's Reference, dated 26th October last, on General Register No. 3449 of 1888, I have the honor to state that the extension of the waterspread of the Nagarapadi tank is due to the increased supply let into it by a channel from the Pelandorai anicut and to the bund having been raised in 1880.

2. It is reported by the Tahsildar of Chidambaram that the lands, which have been recommended to be compensated for, viz., acres 41·55, are submerged for five months during the cultivation season except a tract of punja land comprising field Nos. 195, 397 and 398 which can be cropped before submersion and which therefore can be excluded from our consideration. This will reduce the amount to Rs. 2,881-14-11.

3. All the lands which have been thus affected had been in private holding long before, and were so at the time of, the receipt of the intimation in 1884 from the Executive Engineer that 65 cawnies would be submerged.

4. In November 1879, Mr. Power, the then Head Assistant Collector, issued an order to the Tahsildar that the ryots whose lands were proposed to be taken up for the waterspread should claim remission every year until the Department of Public Works might decide whether the lands were required by them or not, and that till then they should not be permitted to cultivate them. The Executive Engineer having stated, in April 1886, that his department had no idea of effecting any improvements to the tank, the ryots were permitted, but without any condition, to renew the cultivation of their lands. The cultivation was, however, impossible owing to submersion, and hence the claim for compensation.

5. The tank has had no calingulah constructed and the bund breached very often, which helped to drain the tank and facilitate the cultivation in the waterspread, but the breaches would soon be closed by other ryots holding lands below the tank to save their own cultivation. Thus a reaction will ensue and the same amount of damage

will be done to the cultivation in the spread as if the bund had not breached at all. Remission had in consequence to be granted year after year as follows :—

		ACS. C.	RS. A. P.
Fasli	1293—Waste	19 58	70 5 4
,,	1294—Waste and Vellapal	...	194 14 2
,,	1295—Waste	21 99	81 0 6
,,	1296—Waste	17 54	62 2 9
,,	1297—Waste	17 54	62 2 9

It must be remembered that remission was granted only to those who chose to apply for it and that none was granted on inam lands.

6. The construction of the cross and protective bunds as well as the calingulah will not, it is reported, mitigate the evil now caused. Their consideration is therefore of little avail in the decision of the point as to whether or not the lands in question should be acquired by payment of compensation.

7. I beg to forward herewith a sketch plan of the tank showing its contour and the cross and protective bunds proposed to be built by the Department of Public Works, and another showing the old and present waterspread. I also enclose a statement showing in detail how the amount of compensation proposed was arrived at.

ENCLOSURE No. 1.

STATEMENT showing the amount of compensation settled for the lands submerged in the water-spread of the Nagarapadi tank, Chidambaram taluk, on account of the increased storage of water by the Pelandorai channel.

Name of pattadar or inamdar.	Nature of tenure, whether ryotwar or inam.	Area lost and the amount of compensation.						Remarks.
		Number of the field.	Description of the field.	Extent.	Assessment.	Rate of compensation per acre.	Total amount of compensation settled.	
				ACS.	RS. A. P.	RS. A. P.	RS. A. P.	
58. Subbachari	Ryotwar ..	385	Wet	1·17	4 1 6	65 0 0	76 0 9	These rates were based on the average annual outturn prior to fasli 1289, which was between 25 and 30 columns of rice priced from Rs. 60 to 75.
		386	Do.	1·11	3 14 2	65 0 0	72 2 5	
		387-B	Do.	0·68	2 6 1	65 0 0	44 3 2	
		388	Do.	2·10	7 5 7	65 0 0	136 8 0	
1. Sivagangai		389-A	Do.	4· 0	16 0 0	65 0 0	260 0 0	
23. Narayana Padiachi		389-B	Do.	4· 9	16 5 9	65 0 0	265 13 7	
47. Shanmugaivelayuda Pillai		393	Do.	1·56	6 3 10	65 0 0	101 6 4	
57. Killai O. Bhuvarahamurtu Row		387-A	Do.	1·50	5 4 0	65 0 0	97 7 11	
		385-A	Do.	5· 5	17 10 10	65 0 0	328 3 11	
		386-A	Do.	4·37	15 4 9	65 0 0	284 0 9	
14. Arumuga Padiachi		387	Do.	2·50	8 12 0	65 0 0	162 7 10	
5. Kuppusami Teven		195	Dry	1·29	1 4 8	25 0 0	32 4 0	These three fields may be omitted with reference to paragraph 2 of the letter.
		397	Do.	0·73	1 1 6	25 0 0	18 4 0	
		398	Do.	2·22	3 5 4	25 0 0	55 8 0	
	Total ..	..	..	32·37	109 0 0	..	1,934 6 8	
1. Venkannachari	Inam	378-A	Wet	1·32	5 15 0	75 0 0	99 0 0	
2. Subbachari		378-A	Do.	1·32	5 15 1	75 0 0	99 0 0	
3. Venkatakrishna Aiyangar		377	Do.	2·64	11 14 1	75 0 0	198 0 0	
4. Ananthathirthachariar		378-C	Do.	0·65	2 14 10	75 0 0	48 12 0	
5. Puttachari		378-C	Do.	0·28	1 4 2	75 0 0	48 12 0	
		379-B	Do.	0·37	1 10 8			
6. Ramasami Chetti		378-B	Do.	1·83	8 3 9	75 0 0	195 0 0	
		377-A	Do.	0·77	3 7 5			
	Total ..	..	..	9·18	41 5 0	..	688 8 0	
	Interest at 5 per cent. per annum for nine years from fasli 1289 on the amount of compensation of Rs. 709-12-7 due to Killai O. Bhuvarahamurti Row and of Rs. 101-6-4 due to Shanmugavelayuda Pillai						365 0 3	
						Total ..	2,987 14 11	

ENCLOSURES NOS. 2 AND 3.—Plans.

Reference on the above, dated 25th June 1889.

It is stated that the Executive Engineer intimated in 1884 that he proposed to erect cross and protecting bunds (by which 65 cawnies would be submerged) and in 1886 that the works were not to be executed. But nothing is said as to why a notice was issued by the Head Assistant Collector in 1879 that the ryots whose lands were proposed to be taken up should not cultivate them, but should claim remission every year until the Department of Public Works should decide whether the lands were required by them or not. It should be stated who proposed to take them up, and when, and why no steps were taken till now for acquiring them. The nature of the work said to have been executed in 1880 should also be verified by reference to the record of the Department of Public Works, and it should be explained why it is considered that the construction of a calingula will not mitigate the evil. It would seem that it may be so constructed as to keep the F.T.L. at its former limit.

(Signed) M. HAMMICK,
Secretary.

To the Collector of South Arcot.

Read—the following letter from H. SEWELL, Esq., Collector of South Arcot, to the Secretary to the Commissioners of Land Revenue, dated Panruti, 21st January 1890, Ref. on No. 60-Eng. :—

Adverting to Board's Reference, dated 25th June last, on General Register No. 1678 of 1889, I have the honor to report that the Head Assistant Collector Mr. Power's notice of 1879, prohibiting cultivation of the lands for which compensation is recommended, was issued on a petition from one of the ryots who then complained about the submersion and not on the requisition of any officer of the Public Works Department. Mr. Power took no orders from the Collector before he issued the notice and the impropriety of his order was set right in November 1886 by Mr. Gordon who then pointed out to the Head Assistant Collector that Mr. Power's own order written on the petition did not direct that the cultivation on the lands in question should be stopped, but that remission might be claimed where cultivation might be rendered impracticable owing to submersion. In the Tamil translation of this, however, a mistake was made and it was said that if the lands were not excluded from the waterspread, cultivation on them was to be prohibited. It goes on, however, to say that if the lands were submerged the ryots might apply for remission. This was a most confused and blundering translation of the order. It remained in force, however, till November 1886, when it was cancelled as noted above by Mr. Gordon.

2. As regards the nature of the work executed in 1880 and the further question of the construction of a calingula with its crest at the former full supply level of the tank, I beg to enclose copies of the Executive Engineer's letters, No. 844, dated 3rd September 1889 and No. 11, dated 8th January 1890. I cannot, however, agree with that officer's opinion that the breaches were caused by jungle streams. As a matter of fact, all the jungle streams in this part come down from high ground to the south of the Pelandorai anicut channels. These jungle streams formerly used to supply the tanks to the north of the channel (which runs about from west to east). They are now intercepted by the Pelandorai anicut channel and the tanks get their supply—a largely increased one—from the channel itself by means of sluice gates.

3. Under the circumstances stated by Major Smart, the best remedy would seem to be to carry out the improvements proposed by the Public Works Department in 1883-84 but subsequently given up. The Executive Engineer in his letter of 3rd September 1889 appears to contemplate taking up the subject. The whole Pelandorai project, however, has been so singularly unremunerative that it may be a question whether Government would care to spend any more money on it.

ENCLOSURE No. 1.

From Major A. W. SMART, R.E., Executive Engineer, South Arcot Division, to the Collector of South Arcot, dated Cuddalore, 3rd September 1889, No. 844.

With reference to your No. 4302-Eng., dated 3rd August 1889, I have the honor to state that it appears that in 1883 or 1884 Rs. 798 were expended in repairing the bund of the Nagarapadi tank, but the former full supply level was not raised. To build a calingula with its crest at this level will not prevent the lands for which compensation is now claimed from being submerged. To allow of this land being cultivated, it would be necessary to lower the present full supply level to which the villagers holding lands under the tank would be sure not to consent, or to carry out the improvements (or they may perhaps require modification) for which an estimate for Rs. 8,864 was prepared in 1883, but which was laid aside for several reasons. I hope before long to again take up the subject.

ENCLOSURE No. 2.

From Major A. W. SMART, R.E., Executive Engineer, South Arcot Division, to the Collector of South Arcot, dated Cuddalore, 8th January 1890, No. 11.

With reference to your No. 5488-Eng., dated 7th September 1889, I have the honor to state that the work done from 1880 and onwards to the Nagarapadi tank bund consisted in simple repairs, but no attempt was made to raise the full supply level of the tank above its usual level, which in fact is the same to-day as it was in 1880. Breaches in the bund have been caused not by the supply brought from the Pelandorai channel, but from the jungle streams which enter the tank.

2. The supply from the main channel has kept the Nagarapadi tank fairly full so that lands in the bed of the tank which were formerly cultivated have been thrown out of cultivation. The fault has been that the ryots were ever allowed to cultivate these lands, and it is probable, though the records apparently do not show this, that, as has happened in many cases, the lands in the bed of the tanks at first allowed to be cultivated at the risk of the ryots have gradually been transformed into patta. It seems to me that the case is hardly one in which compensation should be paid; in any case the charge should not be debited against the Pelandorai project.

Resolution—dated 18th March 1890, No. 157.

Submitted for the orders of Government.

2. In the above papers, the Collector of South Arcot recommends that a sum of Rs. 2,881-14-11 may be paid to the holders of certain lands in the waterspread of the Nagarapadi tank in the Chidambaram taluk, as owing to the tank, which was formerly a rainfed one, having been placed in connection with the irrigation works at the Pelandorai anicut since 1877, the lands referred to have been uncultivable for the past eleven years. The statement in the second letter read above, that the bund was also raised, is not supported by the Public Works Department and is not insisted on in the Collector's present letter. It is clear that the F.T.L. was not raised, and that the capacity of the tank remains the same as before. But it is equally clear, as admitted by the Executive Engineer, that the tank now receives a better supply than before. In these circumstances, it appears to the Board that the owners of lands in the bed, which have been liable to be submerged at any time, can equitably claim compensation. When the tank was receiving only rain water, the risk of submersion was less than it is now; and although the ryots holding lands in the bed cannot probably legally claim that Government should not store in their tank all the water they can supply, yet on grounds of equity they appear to deserve some compensation for the damage that the increased supply has done. In a similar case in Nellore the claim for compensation has been admitted (*vide* Nellore Collector's memorandum in Board's Proceedings, dated 22nd February 1886, No. 468). On the analogy of that case it would seem that in the present case also the claim may be admitted and it is therefore submitted for the sanction of Government.

3. Some enquiry ought to have been made as to the additional cultivation, if any, rendered possible by the improved supply of the tank; but the case has been pending so long that it is hardly worth while to cause more delay for the sake of the information.

especially as it does not seem possible to revert to the former state of things, the channel having cut off the old sources of supply.

(True Copies and Extract.)

(Signed) M. HAMMICK,
Secretary.

To the Secretary to Government, Revenue Department,
with two plans, to be returned.
Copy to the Collector of South Arcot.

No. 2672, Revenue.

Transferred to the Public Works Department.

Ootacamund,
1st May 1890.

(Signed) C. A. GALTON,
Secretary to Government.

Order—dated 14th June 1890, No. 329 I., Public Works.

The payment of Rs. 2,882 as compensation for the lands submerged in the water-spread of the Nagarapadi tank, Chidambaram taluk, South Arcot division, is sanctioned. In G.O., No. 276 I., dated 16th May 1890, the total sanction for the Pelandorai anicut system was raised to Rs. 4,10,000. An addition of Rs. 3,000 to this amount is now sanctioned to meet the above payment, the balance of the increase, viz., Rs. 118, being added to the existing sanction of Rs. 4,743 for tools and plant, which will then be raised to Rs. 4,861.

2. This sanction has been registered as No. 27 I. of 1890-91.

3. Ordered that a copy of these Proceedings be forwarded to the Government of India for information.

(Here enter No. 330 I., dated 14th June 1890.)

(True Extract).

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation.
" Superintending Engineer, V Circle.
" Examiner, Public Works Accounts.
" Revenue Department.

Endorsement—dated 14th June 1890, No. 330 I., Public Works.

Forwarded.

(By Order.)

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

IRRIGATION.
ACCOUNT.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated June, 14th.

Recd. *Encl.*

G.O., 14th June 1890, Nos. 329 I., 330 I.

JUNE.

'Compensation for Lands

Forwarding copy of Proceedings sanctioning the payment of Rs. 2,882 as — submerged in the water-spread of the Nagarapadi tank, Chidambaram taluk, South Arcot district.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Establishment.

READ—the following papers :—

From J. HANNAN, Esq., Superintending Engineer, II Circle, to the Chief Engineer for Irrigation, dated Bezváda, 12th April 1890, No. 128 K.S.

With reference to G.O., No. 475 I., dated 30th September 1889, approving the defence of the suit filed against the Executive Engineer, Kistna Western Division, in the Bápatla District Munsif's Court, in connection with the possession of an irrigation channel, I have the honor to report that the District Munsif has decided the suit in favor of the plaintiffs.

2. I send, herewith, copy of the judgment as well as a copy of the letter from the Executive Engineer, Kistna Western Division, and solicit your orders on the subject.

3. I do not see any grounds for taking exception to the decision arrived at by the court.

4. I am now writing to the plaintiffs to know if they are willing to make over the channel to Government on payment of cost of excavating it and also cost of aqueduct, and that, if they are not willing to do this, a separate channel will be dug for defendants, and that in this case only sufficient water will be allowed down their channel to irrigate their lands (60 acres).

ENCLOSURE.

Letter from J. E. PAUL, Esq., Executive Engineer, Kistna Western Division, to the Superintending Engineer, II Circle, dated 3rd April 1890, No. 5 S.

With reference to your endorsement, No. 1544 K.S., dated 12th October 1889, I have the honor to report that the District Munsif of Bápatla has decided the suit, No. 179 of 1889, in favor of the plaintiffs (*vide* copy of the judgment enclosed).

2. I have the honor to request that you will be good enough to inform me whether an appeal is to be made or not. I cannot hazard an opinion as to the advisability or not as the judgment is based on law technicalities.

3. I think it might, however, be as well to get the opinion of the Government Law officer on the District Munsif's interpretation of the law in VI issue, para. 17, of the judgment.

4. The portions of the judgment in which the District Munsif reflects on the evidence of Delta Superintendent, Appalaswami Naidu, and a Lock Superintendent, have been sent to them and explanations have been called.

Memorandum to Superintending Engineer, II Circle, dated 21st April 1890, No. II-51 K.S.

Letter from J. E. PAUL, Esq., Executive Engineer, Kistna Western Division, to the Superintending Engineer, II Circle, dated 17th May 1890, No. 86 S.

With reference to your endorsement, No. 311 K.S., dated 1st May 1890, on Chief Engineer's memo., No. II-51 K.S., dated 21st April 1890, I have the honor to give below a bill of costs, amounting to Rs. 58-10-0, incurred in defending the suit, as given by the pleader who was engaged in it.

	RS.	A.	P.
Stamps for vakalatnamahs	1	0	0
Stamps for petitions	6	0	0
Paid for process	7	12	0
Subsistence allowance paid for witnesses	25	11	0
Copy stamps, &c.	4	4	0
Plan fee	0	6	0
Receipt stamp	0	1	0
Pleader's fee	13	0	0
Contingent charges	0	8	0
Total ...	58	10	0

No. 514 K.S.

Submitted to the Chief Engineer for Irrigation with reference to his No. 51 K.S., dated 21st April 1890.

(Signed) J. HANNAN,
Superintending Engineer, II Circle.

26th May 1890.

No. 83 I.

Submitted to Government in accordance with para. 415 of the Public Works Code.

2. The undersigned agrees with the Superintending Engineer that there are no grounds for taking exception to the judgment or referring any points in it for the opinion of the law officers.

3. The case is an instance of how unwise it is to allow in Government systems of irrigation private persons to construct at their own expense, and so acquire rights to, any works, except, of course, those connected with the "field channels" from distributaries with which Government does not interfere, and it is recommended that in future no such works shall be permitted without previous sanction of Government.

4. The costs of the suit amount to Rs. 58-10-0 and sanction to the charge of this to contingencies is recommended.

Ootacamund,
5th June 1890.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Acting Secretary to Government,
Public Works Department.

Order—dated 14th June 1890, No. 331 I., Public Works.

Sanctioned accordingly.

2. In future, except as regards the "field channels," with which Government does not interfere, no execution of works by private persons at their own expense will be allowed in connection with Government irrigation systems or works, without previous sanction of Government.

(True Extract.)

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation.
" Superintending Engineer, II Circle.
" Other Superintending Engineers.
" Examiner, Public Works Accounts.

IRRIGATION.
ESTABLISHMENT.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated June, 14*th.*

Encl.

Recd.

G.O., 14th June 1890, No. 331 I.

JUNE.

Suit

The cost of the —, amounting to Rupees 58-10-0, filed against the Executive Engineer, Kistna Western Division, in connection with the possession of an irrigation channel, sanctioned.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Account.

Read—the following paper :—

Report to accompany the estimate for restoring Rayalcheruvu Old Tank, Peunér River Basin, Rayalcheruvu Group, No. 2 Irrigation Work, Rayalcheruvu Old Tank, Anantapur District, Tadapati Taluk, No. 8 on Imperial List.

Rayalcheruvu old and new tanks are situated about a mile west of Rayalcheruvu village. They affect the Madras Railway, and when they breached in October 1889 some damage was done to the north-west line near the 238th and 244th miles.

2. The old tank is said to have breached many years ago, and when it was repaired the new tank was formed immediately below it to give an additional storage. The crest of the surplus weir of the new tank was fixed $5\frac{1}{4}$ feet above that of the old tank, so that when the tanks were full they formed practically one tank.

3. It is now proposed to abandon the new tank entirely. To provide for the lands hitherto irrigated by it, a new weir will be constructed with its crest one foot higher than the present escape of the old tank. By this means, a sufficient storage capacity will be obtained and the M.W.L. of the tank will be reduced by $4\frac{1}{4}$ feet.

4. *Surplus arrangement.*—The old tank has a rough stone byewash 261 feet long at right flank of the detached bund running west of the hill which separates the two portions of the bund, with its crest at 955·50 or $5\frac{1}{4}$ feet below F.T.L. of the new tank. This work being much damaged, it is proposed to dismantle it and replace it by a weir 425 feet long, with its crest at 956·50 as per plan accompanying. A design for it has been made in this office. The depth of foundations given by the Executive Engineer in his original design is assumed to be correct, and it is to be noted that in his letter No. 41, dated 27th February 1890, he states that the foundations are excellent. It is also assumed that the hill on the right flank of the work is sufficiently rocky to permit of the body wall being joined to it without a wing. More precise information on these points could not be obtained, owing to the party being disbanded. About 120 acres of wet cultivation in the village of Kristnapad, which now are submerged under the present F.T.L. of 960·75, will thus be freed for cultivation, as well as the bed of the new tank.

5. *Existing bund.*—The bund is in very good order and from $2\frac{1}{2}$ to 5 feet higher than is required for a first-class bund. Slight repairs are however necessary here and there, which can be done from the earth got from the site of the proposed weir.

6. *Revetment.*—The revetment also is in very good order and needs no repairs.

7. *Irrigation sluices.*—There are two sluices in the old tank. One has not been in use for about 50 years and is not wanted; the other is in good working order, but it requires some repair in front, and shutters should be provided. As it was imposible to inspect the head and take measurements of the work owing to the depth of water in the tank at the time of inspection, a lump sum of Rs. 50 is allowed in the estimate for such repairs as may be required.

Source of materials.—Rough stone, at site; chunam, Yadaki 3 miles.

All work will be carried out in accordance with the standard specifications of the Bellary division.

CHEPÂK,
May 1890.

(Signed) H. E. CLERK,
for Chief Engineer for Irrigation.

No. 81 I.

Submitted to Government with a recommendation that the estimate of Rs. 12,000 for restoring the Rayalcheruvu old tank in the Anantapur division be sanctioned.

2. The proposal to spend nearly four times the revenue dependent on the tank is due to the necessity for dealing with it in a thoroughly efficient and permanent way as its safety affects that of the railway.

3. The attention of the Superintending Engineer, III Circle, is directed to para. 4 of the report. Before putting the work in hand he should satisfy himself that the provisions made in the estimate as regards foundations are adapted to the circumstances of the case.

OOTACAMUND,
6th June 1890.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Acting Secretary to Government,
Public Works Department.

ORDER—dated 14th June 1890, No. 332 I., Public Works.

The following estimate is sanctioned :—

Irrigation.
43. Minor Works and Navigation.
Irrigation and Navigation.
Works for which neither Capital nor Revenue Accounts are kept.
Anantapur Division.
Original Works.
Tank Restoration Works.

	RS.
Restoring Rayalcheruvu old tank No. 8 in the list of "Imperial" works, estimate	12,000

2. This sanction has been registered as No. 28 I. of 1890-91.

(True Extract.)

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation.
" Examiner, Public Works Accounts.
" Superintending Engineer, III Circle, with enclosures.
" Revenue Department.

IRRIGATION.
ACCOUNT.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated June, 14th.

Recd. *Encl.*

G.O., 14th June 1890, No. 332 I.

JUNE.

**Rayalcheruvu Old Tank,
Anantapur District**

Estimate of Rs. 12,000 for restoring —, sanctioned.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.

Read—the following papers :—

From Colonel J. PENNYCUICK, R.E., Chief Engineer, Periyár Project, to the Chief Engineer for Irrigation, dated Ammayanáyakanúr, 26th May 1890, No. 877 P.R.

As promised in my monthly report printed with G.O., No. 140 I., of 4th March 1890, I have the honor to submit a detailed report regarding the foundations of the Periyár dam with plan and sections.

2. I have refrained in this report from entering upon any personal matters, but I may be allowed to say here that the work from the beginning of December to the middle of April was the most anxious, difficult and exhausting of any which has come within my experience, and that the greatest credit is due to Mr. Taylor and his staff, and, above all, to Mr. Mackenzie for the successful manner in which the difficulties have been overcome.

3. Should the Government consider it desirable to print the report for general circulation, I request that I may be allowed a dozen copies for personal disposal.

Enclosure.

REPORT ON FOUNDATIONS OF PERIYAR DAM.

The bed of the river at the site of the dam is of rock sloping very gently for a short distance on each flank and then dropping suddenly, in some places vertically, towards the deep channel in the centre of the bed.

2. This deep channel is from 50 to 80 feet wide and from 12 to 20 feet below the surface of the water when at its lowest, this surface being 2 feet above the datum line of the Periyár surveys.

3. The maximum flood level is about 20 feet above this datum, but the highest flood recorded since the works were begun is 15 feet above it.

4. The existence of this chasm in the river-bed has added greatly to the difficulty and expense of getting in the foundations ; it gradually narrows both above and below the site of the dam, and disappears entirely a short distance in each direction, but the nature of the banks prevents any great deviation from the actual site.

5. When the original designs were prepared the existence of this chasm was not known, and the bed was supposed to be of tolerably smooth rock with its greatest depth not more than about 6 feet below the minimum water level, and the scheme of construction described in the original report was based on this supposition.

6. It was intended to construct a temporary dam distinct from the main dam, a short distance above it, to a height of 30 feet above datum and a similar dam 10 feet high below the main dam, the space between these two dams being pumped out to enable the foundations of the main dam to be put in.

7. The object of making the upper dam 30 feet high was to obtain, as soon as possible, sufficient head of water for working the machinery for the manufacture of the concrete to be used in the construction of the main dam.

8. When the banks were cleared of jungles and the real conditions ascertained it was evident that the upper temporary dam could not be constructed in the position or by the process originally intended.

9. It was then determined to build this dam about two hundred feet higher up the river, where the central chasm was much narrower, and to lead the ordinary river discharge round the main dam by a channel cut in the earth of the right bank.

10. The flank portions which were in no great depth of water were put in without any serious difficulty, though with frequent interruptions from floods, the protective works being carried away again and again. In order to obtain a foundation for the central portion it was determined to fill the chasm with dry stone up to water level, and to build upon the base thus formed.

11. By the end of February 1889 the flank portions had been built up to 13·00 above datum, vents being left in these portions for the passage of water until the completion of the dam when it was intended to close them with wooden shutters. The central portion on the dry stone base was up to 10·00 above datum, and the base showed no signs of settlement. It was intended to leave the flanks at 13 until the central portion was up to 20 and afterwards always to keep the central portion well above the flanks, so that floods might go over the latter and the rubble base not be disturbed by falling water.

12. At the period mentioned freshes of any magnitude are exceedingly rare, and there was every reason to expect that the central portion would be carried up to the height required without interruption.

13. Unfortunately this expectation was not realized; on the night of the 1st March there was heavy rain over the greater part of the river valley and early the following morning the river rose suddenly, the discharge rising from about three hundred cubic feet per second to four thousand in less than an hour. Of course the greater part of this discharge had to pass over the central portion, the upper part of which was quite fresh, and the green masonry was entirely destroyed.

14. As far as could be seen from very careful observation, the rubble base did not yield at all until after the masonry gave way, but of course when the latter was removed and the whole discharge passed over the former, a good deal of the stone was removed by scour.

15. It was too late in the season to think of restoring the damaged portion on its old lines, and it became necessary to consider whether a different arrangement could be adopted.

16. Before describing the measures ultimately adopted it may be as well to add a few words as to the unsuccessful process described above.

17. It has been suggested (after the event) that this process was overrash and that the rubble base could not have been trusted as a foundation for the masonry. This is very much a matter of opinion. No exception was taken to the scheme by the Inspector-General of Irrigation or by the Chief Engineer for Irrigation (Madras), both of whom visited the works while in progress, or by Sir John Fowler to whom it was explained in detail by myself at Madras in February 1889.

18. Up to the 2nd March there was no sign of settlement of the rubble base, or the smallest crack in the masonry built upon it. The base could of course not be trusted, nor was it intended, to stand the shock of falling water; but it was intended always to keep the central portion well above the flanks, so that flood water might not pass over the former at all.

19. My own opinion is that but for the accident of the flood of the 2nd March occurring just when it did, the dam could have been successfully completed and would have stood for as long as it was wanted.

20. That there was an element of risk in the scheme is undeniable, but it was worth while to run this risk for the sake of the saving in time and labor which would have been obtained had the plan been successful.

21. It may perhaps appear that I have gone into more detail with regard to this scheme than is necessary in the case of an abandoned plan, but there is often more to be learned from failures than from successes, and the subject has sufficient interest to justify a full account of every step in the construction of the works.

22. The flood which caused the injury described above was not of long duration and by the 5th March the river had returned to its normal condition. It was then necessary to decide, and to decide promptly, whether we should re-build the damaged work on its old lines or whether any change of plan was practicable.

23. To adopt the former course meant a whole season's delay; only four weeks more remained during which work was practicable, and it was physically impossible to complete the dam within that period, while any work left unfinished would infallibly be destroyed in June; practically, therefore, it would be necessary to wait till the following January before anything could be done.

24. It was decided to abandon the idea of constructing a temporary dam separate from the main dam merely to raise the water to the height necessary for working the machinery, and simply to enclose the site of the main dam by a coffer dam of sufficient height to keep out the ordinary cold weather stream.

25. It was recognized that this coffer dam must be of masonry as except from January to March it was impossible to reckon on a fortnight without a fresh which would carry away any earthen bank.

26. The first step was to construct a row of masonry piers (see plan) as close as possible to the right edge of the deep chasm, extending from the temporary dam to a short distance below the rear face of the main dam. These piers were 6 feet apart 5 feet wide, with their tops at 13 above datum, three feet thick at top with their rear faces stepped 1 foot horizontal for 2 feet vertical. It would have been better to have made them somewhat thicker, as the dimensions given left very little margin of stability against sudden shocks (in fact several of them were afterwards carried away by trees striking against them), but it was feared that if this were done it would not be possible to complete them by the end of March.

27. The portion of the temporary dam between the line of piers and the right bank was removed and the piers continued a little higher up, to a point where the central chasm was still narrower and shallower, the line was then continued down the left side of the chasm to the left portion of the temporary dam.

28. It will be seen from the plan that when the spaces between these piers were closed by wooden shutters or other means, and a dam put across the river between the lower end of the line of piers and the left bank the site of the dam would be completely enclosed as long as the discharge of the river did not exceed what could be carried by the space between the piers and the right bank (about 2,000 cubic feet per second) and if the coffer dam were water-tight it would only be necessary to pump out the enclosed space to enable the foundations of the main dam to be put in without difficulty.

29. It was, however, certain that the coffer dam would not be water-tight especially at the upstream end where the closure would have to be made by sand bags, and that the leakage would be more than the pumping power at our disposal could deal with. A second dam was therefore necessary above the main dam, to take up this leakage and pass it by a minor byewash on the left flank.

30. It was at first intended to make this byewash with piers and shutters similar to those on the right bank, though not so high, but time did not allow of the completion of the whole of the piers, and for part of the length an earthen bank was substituted, which acted quite satisfactorily.

31. The construction of all the piers shown on the plan was finished by the end of March 1889 when work was suspended till July.

32. In most years there is an interval between the two monsoons (from the middle of August till the middle or end of October) when the river is comparatively low, and it was thought possible that the cross dams might be put down and a portion of the masonry got in, during this interval.

33. In 1889 this interval did not exist, the discharge of the river being almost as great in August as in July, and in September and October considerably higher. On the other hand, the north-east monsoon was an entire failure and there was very little rain in November.

34. The intervals between the piers were closed by wooden shutters, and the central gap between the upper ends of the right and left bank rows was closed by a mass of sand bags.

35. It may be mentioned here that sand bags were very freely used and were found invaluable for closing gaps of all kinds, such as those left by the destruction of piers by floods. In some cases they were put down when the velocity was so great as to carry away the bags like pieces of paper, but there was never any serious difficulty in checking the velocity by wooden trestles and planks under cover of which the bags were deposited. The flood of the 18th December passed two feet over the sand bag bank at the upper end of the coffer dam and did no damage beyond the displacement of a few bags in the rear slope.

36. Towards the end of November it seemed likely that no more floods were to be expected and the construction of the cross dams was put in hand. These dams were formed by putting down wooden trestles five feet apart in the line of the dam, each trestle being composed of two uprights and from three to six (according to the depth of water) horizontals running transversely to the dam. The latter carried longitudinal horizontals which supported vertical planks (sheet piling) driven down as close as possible.

37. The space between the two rows of sheet piling was filled in with earth, forming a dam twelve feet wide at top with side slopes of one in four; the crest of the upper dam was put at + 8 which was considered enough to turn the leakage through the pier and shutter dam into the left bank byewash, and that of the lower dam at + 6.

38. At a later period (as soon as the masonry had reached a sufficient height) the space between the earthen dams and the main dam was filled in with good earth, forming a convenient platform for the movement of workmen and arrangement of materials, and probably, to some extent, reducing the risk of percolation.

39. The main stream of course passed by the right bank byewash, and the only current in the portion of the bed occupied by the cross dams was that due to the leakage (which subsequent measurements proved to be from 25 to 30 cubic feet per second according to the level of the water above the coffer dam), but this current, slight as it was, caused a great deal of trouble in the central part of each dam, washing out the earth between the planks; this action was stopped by the use of bamboo matting, and no really serious difficulty was experienced in completing the earth filling.

40. The cross dams were completed on the 14th December, but there was more delay than was expected in getting the engine and pump into position and pumping was not actually begun till the 17th; on the following day there was very heavy rain (three inches in four hours) and during the night the river rose to 7·2 on our gauge, representing a discharge of about 6,000 cubic feet per second.

41. Two of the coffer dam piers were destroyed and the upper earthen dam was almost entirely carried away; the lower dam was much less injured than was to be expected, nearly half of it being left almost undamaged; the trestles carrying the pump and pipes were overturned and the pump buried in the bottom of the river, where it remained till it was dug out in April. The belt used for driving the pump, a cotton one made by Gandy and Company, was dug out apparently entirely uninjured by its four months' burial.

42. A still higher flood occurred on the 28th December and it was not until the middle of January that the river was low enough to enable work to be resumed; this, however, was of no great consequence as a certain delay was inevitable, while the wood work for a fresh set of trestles was being prepared.

43. Work was resumed on the 12th January, the gap caused by the destruction of the two piers mentioned above was closed by sand bags, and the erection of the trestles for the cross dams begun on the 15th. The latter were entirely completed and pumping begun on the 27th.

44. A slight delay was caused by a slip in the lower dam (the only occasion on which the cross dams gave any trouble) which let the water into the space between the dams, but the site was sufficiently cleared to enable masonry to be begun on the 30th.

45. It should be mentioned here that the whole of the pumping after the 27th January was done with a 6″ Gwynne's centrifugal pump, which worked admirably. This size of pump is stated by the maker's advertisements to be capable of throwing five hundred gallons per minute; but, as a matter of fact, it was found able to throw more than double this amount without any undue strain. It worked night and day with very few stoppages from the 27th January till the end of March after which the night work was stopped.

46. It was of course impossible, in the time available, to get in the foundation over the whole area of the dam, even up to normal water level; it was therefore determined to construct only the front and rear portions (*vide* sections) up to such a level as would be safe from submergence by moderate freshes, leaving the central part to be done in the following season.

47. Of the two walls to be thus constructed, the front one was designed for a height of 25 above datum or about 43 feet above the deep bed, so as to allow the water to be raised as soon as the machinery was ready for work, though it was not expected that it would be completed to this height during the current season.

48. The lower wall was to be 7·50 above datum, a height sufficient to keep out all floods which did not top the upper wall.

49. The space between the two cross dams was of course partly filled with sand and earth from the remains of the old earthen dam, which had to be removed in order to lay bare the rock.

50. No serious difficulty was experienced in the construction of the lower wall where there was plenty of room to work the earthen dam being 50 feet from the masonry.

51. At the upper wall the conditions were not so favorable; not only was the depth of excavation greater, but the *debris* of the old earthen dam covered a good deal of the ground to be occupied, and to remove this *debris* without risk to the new dam which to some extent rested upon it, was a work of great difficulty and delicacy.

52. It would have been better had the new dam been put 30 or 40 feet higher up stream, but when it was constructed the presence of so much of the old dam was not suspected.

53. The excavation had to be carried on foot by foot in loose sand and slush which had to be carefully planked and shored up as the work extended, and the want of space was very seriously felt.

54. This made progress very slow and difficult, and it was not until the 18th February that the masonry was carried right across the bed, and then not to the full thickness of the wall.

55. On the 24th February the rear wall was just completed and the front wall raised, though not to its full thickness, to a height of about 7 above datum except for a length of forty feet in the middle which was from six to seven feet lower.

56. On that day there was a fresh, not very high, but unusual at that time; it would probably have done little or no damage had not one of the coffer dam piers given way, letting the water into the pool between the coffer dam and the upper cross dam; the latter was of course topped and breached and the water passed over the masonry. In the upper wall there was space enough for the water to flow over at a very moderate velocity and absolutely no damage was done; in the lower wall the upper part, which was quite fresh, was more or less injured, but the damage was on whole very much less than was expected; the lower cross dam was of course breached, but not badly.

57. The restoration of the earthen dams and pumping out the enclosure caused only three days' delay, and work could have been resumed on the 28th, but the weather was so bad and the river so high that little or nothing could be done till the 5th March, after which there were no further interruptions and work went on smoothly.

58. A certain amount of trouble was experienced in extending the front wall across the left bank byewash, owing to an unexpected dip in the rock, but this caused no serious difficulty.

59. A vent was left in this portion of the wall for the passage of water into the left byewash, to be closed by a wooden shutter as soon as the masonry was sufficiently advanced.

60. It was determined to leave the work for the season with the top of the wall at 20 above datum with the exception of a length of 60 feet on the left flank which was to be left at 16, and by the 15th April this had been done, except the vent itself and a short length on each side which was left to bond in with the masonry used in closing the vent.

61. The shutter was then put down and the vent built up as quickly as possible. This operation was interrupted by a rather heavy flood on the 19th April which passed over the lower portion of the wall and did some little damage to the newest part of the work; the interruption was particularly annoying at a time when fever was beginning to show itself and there was considerable difficulty in obtaining labor; the work was, however, finally completed by the 26th April.

62. While the front and rear walls were in progress, piers with their crests at 15 had been built between those of the coffer dam piers on the right bank which came between the two walls, so as to increase the carrying capacity of the main byewash from 12 to 15.

63. The dam site is thus enclosed by a solid wall which will not be submerged except on comparatively rare occasions, and the remainder of the foundations can be put in, under cover of this wall, without serious difficulty. There will be occasional interruptions, but they will be interruptions only, and will not involve the destruction of any work already done.

64. When work is resumed next season the front wall will be raised to 25 and the entrance to the main byewash closed to a sufficient height to cause a portion of the river water to pass above the weir (which has been completed) leading to the turbine for driving the machinery.

65. The walls above described were not benched into the rock, as time was of the utmost importance; they were built on the natural surface, which was carefully cleaned, with Portland cement; this material was used for the lower two feet of the walls throughout their thickness, and for the front two feet throughout their height; the remainder was built in ordinary mortar; the lime is of admirable quality, moderately hydraulic, and has been exposed to very severe tests which it has stood satisfactorily.

66. Over the remaining portion of the area the rock will be carefully benched and every precaution taken to prevent sliding and percolation between the dam and the rock on which it rests.

67. It was found by careful measurements that the total leakage into the enclosure after the latter was pumped dry was about half a cubic foot per second, of which quite half and probably more was through and under the shutters of the coffer dam; the leakage between the wall and the rock is believed to be confined to a short length in each wall, and no difficulty is anticipated in stopping it completely when the enclosure is again cleared out.

68. This report is accompanied by a general plan of the site and by sections of the river bed at various points. The plan was taken in January last, before the masonry was begun, the sections just before work was suspended in April.

Ammayanayakanur, 26th May 1890.

(Signed) J. PENNYCUICK, Colonel, R.E.,
Chief Engineer, Periyár Project.

No. 85 I.

Note by the Chief Engineer for Irrigation.

This most interesting report is submitted to Government.

2. With reference to para. 17 of the report, the undersigned considers it right to say that, as will be seen from clause (i), para. 3 of his Inspection notes with

Proceedings of Madras Government, No. 115 I., dated 4th March 1889, the foundations of the "temporary dam" had been carried out before he knew their character and that he at all events anticipated that the dry rubble base to part of the work would lead to cracks; whether it would eventually have led to destruction is, as Colonel Pennycuick remarks, a matter of opinion which need not be now discussed as the work was destroyed from other causes—see paras. 13 and 14 of the report.

3. Colonel Pennycuick bears testimony to the creditable way in which the Executive Engineer, Mr. H. S. Taylor, and his staff seconded his own indefatigable labors in overcoming the great difficulties which have had to be contended with in the past season, and he brings to particular notice, as he did also in his Report on Progress for December 1889 and January 1890, the exceptionally good service of Mr. Mackenzie, which in a demi-official he characterizes as "simply beyond praise."

OOTACAMUND,
4th June 1890.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Acting Secretary to Government,
Public Works Department.

ORDER—dated 16th June 1890, No. 333 I., Public Works.

Government has read with interest the report of the Chief Engineer, Periyár Project, on the "foundations of the Periyár dam" with its record of the indefatigable labors of Colonel Pennycuick and his staff in combating and overcoming the great difficulties which have been encountered. The excellent service rendered by Mr. Mackenzie, to which Colonel Pennycuick has already in previous reports borne testimony, is noticed with special commendation.

2. The report will be printed and with photo-zincograph copies of the survey plan and sections will be circulated to the officers of the Public Works Department, twelve copies being furnished to Colonel Pennycuick.

(True Extract.)

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation, Periyár Project.
" Consulting Engineer for Railways.
To Superintending Engineers.
To the Consulting Architect to Government.
" Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.

Govt. of {1890} Madras

PUBLIC WORKS.

Dated June, 16th.

Recd. *Encl.*

G.O., 16th June 1890, No. 333 I.

JUNE.

Foundations of the Periyar Dam

Orders on the report of the Chief Engineer, Periyár Project, on the —.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.

READ—the following paper :—

From C. VINCENT, Esq., Under-Secretary to the Government of India, Public Works Department (Civil Works—Irrigation), to the Secretary to the Government of Madras, Public Works Department, dated Simla, 8th May 1890, No. 78 I.

I am directed to address you regarding some minor points in the Revenue Report of Irrigation Works in Madras for 1888-89, that were not noticed in the review of that report issued with Resolution No. 41 I. of the 1st March 1890.

2. The first point is as regards the form in which statement No. II, printed on pages 6 and 7 of the report under reference, should in future be prepared.

It would, I am to say, in the opinion of the Government of India, be conducive to clearness, and to the accurate appreciation of the financial results of the operations of the year, if this statement were in future to be prepared in the form which is attached to this letter. The principal changes introduced in the form as printed in the report are :—

(1) In column 2 the area irrigated is to be the area charged as irrigated under first and second crops as given in the individual Canal reports, and not that under first crop only.

(2) To the irrigation revenue proper is to be added the share of enhanced land revenue, the revenue of previous years brought into account, and the receipts in the Public Works Department. This will give the gross receipts on account of each system. Refunds should be treated as deductions from revenue.

(3) To the direct and indirect charges are to be added the collection charges in the Civil Department. This will give the gross expenditure on each system.

(4) The difference between the gross receipts and expenditure will be the true net revenue.

(5) From this should be deducted the difference between the old maintenance receipts and charges, which, as noticed in para. 4 of the review of the report, may, it is hoped, be now crystallised. This will give, in column 14, the net revenue due to the outlay of Government capital.

(6) The other columns require no remark.

3. The second point is as regards the use of the terms "kharif" and "rabi" in statement No. I-E. The use of these terms in connection with Madras Irrigation is somewhat misleading, and I am to suggest that in future first crop and second crop might with advantage be substituted for these terms respectively. The figures given in column 6 of the same statement for the total of the two crops do not, I am to add, agree with the corresponding figures in the individual Canal reports as should evidently be the case.

4. I am to request that with the approval of His Excellency the Governor in Council the changes above noted may be introduced into the report for 1889-90.

5. I am further to suggest that the maps illustrating the report should not be in-bound with it, as is the case with those of the Kistna, Pennér and other systems, but should be bound, as is the map of the Kurnool canal, so as to lend themselves more readily to examination.

ENCLOSURE to P. W. D. letter No. 78 I. of 1890.

STATEMENT showing the receipts compared with the charges for ________.

Systems.	Area irrigated.	Revenue derived for the Fasli year ending 30th June					Expenditure during the official year				True net revenue.	Old maintenance receipts *less* charges.	Net revenue less old maintenance receipts and charges.	Interest charges.	Surplus revenue due to outlay of Government Capital.	Capital outlay, including Indirect charges.	Percentage of net revenue due to outlay of Government Capital.
		Irrigation revenue.	*Add*—share of enhanced Land Revenue.	*Add*—Revenue of previous years brought into account.	Receipts in the Public Works Department.	Total.	Direct charges.	Indirect charges.	Collection charges in the Revenue Department.	Total.							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	ACRES.	RS.	RS.	RS.	RS.	RS.	RS.	RS.	RS.	RS.	RS.	RS.	RS.	RS.	RS.	RS.	PER CENT.
	This column to include area charged as irrigated under first and second crops, as given in the individual Canal reports.	As in column 3 of statement II.	As in column 6 of statement II.	As in column 7 of statement II.	As in column 11 of statement II.	Total of columns 3, 4, 5 and 6.	As in column 13 of statement II.	As in column 14 of statement II.	As in column 9 of statement II.	Total of columns 8, 9 and 10.	Difference between columns 7 and 11.	Difference between old maintenance receipts and charges for each system, which are to be fixed amounts.	Column 12 *minus* column 13.	Column 17 of statement II.	Column 14 *minus* column 15.	Column 19 of statement II.	Percentage of column 14 on column 17, *i.e.*, column 20 of statement II.

N.B.—Where columns in statement II are mentioned, reference is made to that statement in the Report for 1888-89. Where statement II is not mentioned, reference is made to the columns in this form.

No. 86 I.

Note by the Chief Engineer for Irrigation.

With reference to letter No. 78 I., dated 8th May 1890, from the Secretary to the Government of India, Public Works Department—

(1) Statement II of the Administration Report shall of course be in future prepared in the form furnished.

(2) It has been several * times pointed out that the terms "kharif" and "rabi" were inapplicable to the conditions which obtain in this Presidency, and the continuance of their use appears to have arisen from the supposition that the headings of the columns in the forms received with Resolution of the Government of India, No. 166 I., dated 11th July 1885 (see Proceedings of the Madras Government, No. 673 I., dated 3rd August 1885), were intended to be adhered to; in future "first crop" and "second crop" will be substituted.

* See Proceedings of the Madras Government, No. 2934, dated 5th December 1873.
See para. 5 of Note by Chief Engineer for Irrigation with Proceedings of the Madras Government, No. 264 I., dated 23rd April 1880.
See para. 10 of Note by Chief Engineer for Irrigation with Proceedings of the Madras Government, No. 918 I., dated 11th November 1882.

(3) As regards the apparent discrepancy noticed in para. 3 of the Government of India letter: the figures in column 6 of statement I-E. show the areas *actually irrigated* whilst those in the individual reports of systems or canals show the areas "*charged as irrigated*," as stated by the Revenue authorities. It is evident that the latter will often, from failure of ryots to cultivate lands for which they pay wet assessment, exceed the former, and as in the reports on individual systems an "average rate per acre" of irrigation revenue is struck, it seems necessary there to show the *total* area on which that revenue was raised.

(4) The inconvenience of the "in-binding" of the maps referred to had already received notice, and arrangements have been made to avoid it in future.

Ootacamund,
9th June 1890.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Acting Secretary to Government,
Public Works Department.

Order—dated 18th June 1890, No. 334 I., Public Works.

Ordered that the following letter be sent.

(Here enter No. 335 I., dated 18th June 1890).

(True Extract.)

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation.
" Chief Engineer, Periyár Project.
To Superintending Engineers.
To the Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated June, 18th.

Recd. *Encl.*

G.O., 18th June 1890, No. 334 I.

JUNE.

Revenue Reports of Irrigation Works, Madras

Ordered that the Government of India be addressed on the subject of the changes suggested by it to be introduced in the — for 1889-90.

PUBLIC WORKS DEPARTMENT.

Irrigation.

Letter—from

G. T. WALCH, Esq.,
Acting Secretary to the Government of Madras,
Public Works Department,

To

The SECRETARY to the GOVERNMENT of INDIA,
Public Works Department.

Sir,

I am directed to acknowledge the receipt of your letter of 8th May 1890, No. 78 I., and to say that the wishes of the Government of India therein conveyed shall be attended to.

2. As regards the difference between the figures given in column 6 of statement I-E. and those given in the reports on individual systems or canals, I am to say that, under the explanation given in para. 3 of the Note by the Chief Engineer for Irrigation, herewith sent, the present system will be adhered to unless a modification of it be specially ordered.

I have the honor to be,
Sir,
Your most obedient servant,

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

Ootacamund,
18th June 1890.

IRRIGATION.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated June, 18th.

Recd. *Encl.*

18th June 1890, No. 335 I.

JUNE.

Revenue Reports of Irrigation Works, Madras

Regarding certain changes suggested to be introduced in the — for 1889-90.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Establishment.

READ—the following paper:—

From G. H. D. WALKER, Esq., Under-Secretary to the Government of India, Public Works Department (General), to the Secretary to the Government of Madras, Public Works Department, dated Simla, 6th June 1890, No. 1485 G.

I am directed to acknowledge the receipt of your letter, No. 260 I., dated the 30th April 1890, and, in reply, to state that the Government of India is pleased to extend the sanction contained in Public Works Department No. 1339 G., dated the 11th May 1889, for the re-employment of a Special Deputy Collector and his establishment for the acquisition of land required for the Rushikulya project, from three to six months, the monthly cost being reduced from Rs. 700 to Rs. 570.

ORDER—dated 18th June 1890, No. 336 I., Public Works.

Communicated to the departments and officers concerned for information with reference to G.O., No. 259 I., dated 30th April 1890.

(True Extract.)

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation.
" Superintending Engineer, I Circle.
" Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.
ESTABLISHMENT.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated June, 18th.

Recd. *Encl.*

G.O., 18th June 1890, No. 336 I.

JUNE.

Special Deputy Collector

Letter from the Government of India extending the sanction for the re-employment of a — and his establishment for the acquisition of land for the Rushikulya project from three to six months at a reduced monthly cost of Rs. 570, communicated to the departments and officers concerned for information.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Account.

READ—the following paper :—

From J. HANNAN, Esq., Superintending Engineer, II Circle, to the Chief Engineer for Irrigation, dated Bezváda, 2nd June 1890, No. 150 N.L.

I have the honor to forward herewith, for your approval and sanction, an estimate, amounting to Rs. 4,529, for improvements to Dugarázpatnam tank No. 239, "Dugarázpatnam tank group" in the Nellore division.

2. The necessity for the work is explained in the report accompanying the estimate.

3. The estimate has been countersigned by the Collector.

ENCLOSURE.

REPORT to accompany the Plans and Estimates for the Dugarázpatnam Tank No. 239 improvements, Dugarázpatnam Tank Group.

	RS.
Amount of estimate	4,530.
Date of last repairs / Amount of do.	Not known.

This tank is the terminal of the group of six tanks. Out of these only three are Government tanks, and all the rest are zemindari and shrotriem.

Two of the Government tanks, Mottembaka and Vakad large tanks, have been put into complete order and adequate surplus weirs provided; not one of the zemindari tanks as shown in the hydraulic statement has been provided with efficient surplus weirs, and the Collector has been requested to instruct the parties concerned to construct adequate surplus weirs at an early date.

The bund of the Dugarázpatnam tank has in many places been cut away very much indeed, and practically a new bank is required along the sand ridge north of the weir. This seems to be due to the fact that the old bank at this place was blown away during the strong westerly winds. To remake this bank with sand will be to have it blown away again in a very short time. To prevent this it is proposed to use good earth from inside the tank and about 400 feet from the bank. For this portion an extra rate has been allowed for the earthwork for the extra lead. The estimate provides for raising the bank throughout to a uniform height of 3 feet above M.W.L., top width 4·5 feet, and the slopes have been made 3 to 1 on account of sandy nature of soil. The inner slope up to a foot above M.W.L. will be planted with Vidavali with turfing above. Turfing has been provided for the rear slope for a strip of 3 feet to prevent cutting away at top, at the sand ridge, and breach, the whole of the rear slope is to be turfed.

There are two masonry sluices at present. These are in bad order, and a third sluice ruined, and a fourth sluice washed away. It is proposed to rebuild these sluices. The ryots require a fifth sluice, the estimate accordingly provides for a fifth sluice.

The front wings and returns of the existing weir have cracked and are in bad order. These are therefore to be demolished and rebuilt. The loose stone apron has to be removed and repacked. Sundry improvements to the weir have also been provided for. The catchment area is 8 square miles, the discharge for which with a coefficient 450 is 1,800 cubic feet a second, to

dispose of which allowing 2 feet as depth over weir 188 feet is required. The present escape is only 51 feet long, and the balance 133 feet is proposed to be passed over the sand ridge where some of the surplus now passes and double the length of ground (= 266 feet) will be left unbanked for ground escape, the fall outside being very flat the ground would not be scoured, and besides Vidavali planting is provided to prevent the surplus doing any damage. The surplus will join the old surplus channel near the casuarina tope.

The tank has got a cultivation of about 710 acres with a revenue of Rs. 3,186 and an ayacut of about 819 acres with an assessment of Rs. 3,642. The bank is in such a dilapidated state that the ryots have not been able for many years to store full supply, and consequently 109 acres are left waste.

The improvements are therefore very necessary as the present state of the bank is growing worse year by year and the tank will be soon reduced to hold only half supply. The improvements are urgently recommended for early sanction.

NELLORE,
28th February 1890.

(Signed) H. O'CONNELL,
Executive Engineer, Nellore Division.

ORDER—dated 20th June 1890, No. 337 I., Public Works.

The following estimate is sanctioned:—

Irrigation.
43. Minor Works and Navigation.
Irrigation and Navigation.
Works for which neither Capital nor Revenue Accounts are kept.
Nellore Division.
Original Works.

	RS.
Improvements to Dugarázpatnam tank No. 239 on the list of "Imperial Works," estimate	4,530

2. This sanction has been registered as No. 32 I. of 1890-91.

(True Extract.)

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation.
" Superintending Engineer, II Circle, with twelve enclosures.
" Examiner, Public Works Accounts.
" Revenue Department.
" Editors' Table.

IRRIGATION.
ACCOUNT.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated June, 20th.

Recd. *Encl.*

G.O., 20th June 1890, No. 337 I.

JUNE.

Dugarazpatnam Tank, Nellore Division

Estimate of Rs. 4,530 for improving the —, sanctioned.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Account.

Read—the following paper :—

No. 417 T.J.

Report by the Superintending Engineer, VI Circle, on the estimate of Rs. 5,740 for diverting the Chinnar Surplus and forming a cross bank above set of Mahandrapally, Coleroon Right Bank, 98th mile, in the Tanjore Division.

There is a dangerous set against the right bank of the Coleroon at B.M. $\frac{100}{2}$ in Mahandrapally limits. The bank at this place had to be temporarily protected twice during last year, at a cost of about Rs. 2,000, to prevent the occurrence of breaches. It was decided by the Superintending Engineer, on his inspection in January last, that the Chinnar surplus which falls into the river just above the set in question should be diverted so as to have its infall higher up as shown on the survey, in order that the current of the Coleroon may turn towards the north branch of the river and that the weak bank at the set may be permanently strengthened, as the margin has been cut away right up to the bank.

2. The estimate provides for diverting the Chinnar surplus as marked on the survey (*vide* plan No. 1, sheet No. 1) and for throwing an embankment on its right side across the padugai, sufficiently strong to act as a groyne. The position of the embankment is also marked on the survey. The top width of the embankment will be 9 feet, up-river slope being 3 to 1 and down-river 2 to 1. Its end slope on the river side will be 3 to 1, and the nose will be revetted with concrete blocks for 50 feet in length measured along the top of the bank on the up-river slope and 30 feet on the down-river slope. The top of the bank will be 3 feet above M.F.L. similar to that of present right bank of Coleroon at the site. The top of the block revetment will be carried to 1 foot about M.F.L. It will be $1\frac{1}{4}$ feet thick with a foundation $2\frac{1}{2}$ feet broad and 5 feet deep. This is necessary as there is likely to be velocity and scour here.

3. The bottom width of the proposed new surplus channel will be 25 feet with side slopes 1 to 1. This has been arrived at by calculation with a fall of 1 in 4,000.

4. To protect the slopes of the new embankment, provision is made in the estimate for turfing.

5. The area of land required for the proposed diversion is 11 acres, and a provision of Rs. 770 is made in the estimate for land compensation at Rs. 70 per acre.

6. Owing to the scarcity of labor in the locality the rates for earthwork and turfing have been slightly increased and the estimate is recommended for sanction.

7. As the work is of an urgent nature, it is requested that permission be granted for putting the same in hand at once, sanctioning a specific allotment from the reserve at the disposal of Government.

Fort Hamilton,
29th May 1890.

(Signed) A. C. SMITH, Lt.-Col., R.E.,
Superintending Engineer, VI Circle.

Order—dated 21st June 1890, No. 341 I., Public Works.

The following estimate is sanctioned :—

Irrigation.
43. Minor Works and Navigation.
Agricultural Works.
Tanjore Division.
Original Works.
Drainages.

	RS.
Diverting the Chinnar surplus and forming a cross bank above the Mahandrapally set, Coleroon right bank, 98th mile, estimate ...	5,780.

2. This sanction has been registered as No. 29 I of 1890-91.

3. Rupees 5,780 or Rs. 7,196 including establishment and tools and plant charges are appropriated to the work now sanctioned by transfer from the reserve at the disposal of Government under the head " 43. Minor Works and Navigation, Irrigation and Navigation Works for which neither Capital nor Revenue Accounts are kept, Original Works."

(True Extract.)

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation.
,, Superintending Engineer, VI Circle, with four enclosures.
,, Examiner, Public Works Accounts.
,, Revenue Department.
,, Editors' Table.

IRRIGATION.
ACCOUNT.

Govt. of {1890} Madras,

PUBLIC WORKS.

Dated June, 21st.

Recd. *Encl.*

G.O., 21st June 1890, No. 341 I.

JUNE.

Chinnar Surplus

Estimate of Rs. 5,780 for diverting the — and forming a cross bank above the Mahandrapally set, Coleroon right bank, 98th mile, sanctioned with remarks.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Account.

Read—the following paper :—

Endorsement from the Superintending Engineer, I Circle, dated 6th June 1890, No. 215 G.N.

Order—dated 24th June 1890, No. 350 I., Public Works.

The following transfer of funds is sanctioned :—

43. Minor Works and Navigation.

From
Irrigation and Navigation.
Works for which neither Capital nor Revenue Accounts are kept.
Minor Original Works.

	RS.
Reserve	2,000
Establishment	460
Tools and plant	30
Total ...	2,490

To
Ganjam Division.
Agricultural Works.
River Embankments.

	RS.
Repairs	2,000
Establishment	460
Tools and plant	30
Total ...	2,490

(True Extract.)

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation.
" Superintending Engineer, I Circle.
" Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.
ACCOUNT.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated June, 24th.

Recd. *Encl.*

G.O., 24th June 1890, No. 350 I.

JUNE.

Funds

Sanctioning certain transfer of —.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Account.

READ—the following paper :—

From Major D. McNEIL CAMPBELL, R.E., Superintending Engineer, IV Circle, to the Chief Engineer for Irrigation, dated Coimbatore, 28th May 1890, No. 53 E.I.

I have the honor to forward, for sanction of Government, two revised estimates amounting to Rs. 38,377, or Rs. 5,075 more than the original estimates, for the following works in connection with the Barur Tank project :—

—	Amount of original estimate.	Amount of revised estimate.	Excesses.
	RS.	RS.	RS.
I. Cutting Kilkuppam East main channel	24,906	27,634	2,728
II. Do. do. Branch channel No. 3	8,396	10,743	2,347
Total ...	33,302	38,377	5,075

2. The excess in both cases is due to the provision in the estimate for rock cutting having been found quite insufficient and also to an error of one foot in the levels.

3. The aggregate excess of Rs. 5,075 will be met from the amount of savings, &c., as detailed below, viz., Rs. 5,983 :—

		RS.	RS.
I.—Balance at present available for unforeseen works, *vide* G.O., No. $\frac{214}{A}$ I. of 31st March 1890		580	
II.—Anicut across the Pennér river near Nedingal, estimate, *vide* G.O., No. 479 I. of 8th August 1887		22,905	
Amount of revised estimate for ditto. submitted with my letter No. $\frac{283}{E.I.}$ of 16th April 1890 ..		21,262	
Savings ...		1,643	
Deduct amount already accounted for, *vide* G.O., No. 627 I. of 17th December 1889	450		
Deduct amount already accounted for, *vide* G.O., No. 253 I. of 28th April 1890	129		
Amount of excess outlay, Rs. 565, in completing the work for constructing accommodation bridge near Chettiyur village (Rs. 536) sanctioned in memo. No. $\frac{IV}{34\ S.L.}$ of 1st October 1888	29		
		608	
			1,035

	RS.
III.—Savings effected in completing the work (Rs. 160) for cutting tail channel from the first seven sluices of East main channel sanctioned in G.O., No. 548 I. of 11th November 1889	30
IV.—Savings anticipated on the estimate (Rs. 4,570) for constructing 19 masonry falls sanctioned in G.O., No. 748 I. of 1st September 1885 ...	1,938
Amount of estimate for cutting branch channel of East main channel sanctioned in G.O., No. 748 I. of 1st September 1885, which was recommended to be abandoned in this office endorsement No. $\frac{128}{E.I.}$ of 11th November 1889 on the Executive Engineer's letter	2,400
Total ...	5,983

Office note to the Examiner, Public Works Accounts, dated 7th June 1890, No. 112.
" from " " " " 11th " No. 4034.

No. 88 I.

Submitted to Government.

2. The revised estimates, as slightly modified in this office, amount to Rs. 38,300 and are recommended for sanction, the excess of Rs. 4,998 over the original estimates being met as shown below :—

		RS.
(1) Balance at present available for unforeseen works, Barur Tank project, *vide* G.O., No. 288 I., dated 21st May 1890		1,462
(2) Saving realized on tail channel from the first seven sluices of East main channel sanctioned in G.O., No. 548 I., dated 11th November 1889		30
(3) Sanctioned provision for No. 4 branch channel of East main channel reported not to be required		2,400
(4) Anticipated saving on 19 masonry falls sanctioned in G.O., No. 748 I., dated 1st September 1885		1,154
Deduct—		
(1) Excess outlay on accommodation bridge near Chettiyur village	29	
(2) Difference due to estimate cancelled in G.O., No. $\frac{214}{A}$ I., dated 31st March 1890, being taken as Rs. 580 instead of Rs. 561, with reference to G.O., No. 591 I., dated 28th November 1889	19	
		48
Balance available to meet excess		4,998

OOTACAMUND,
16th June 1890.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Acting Secretary to Government,
Public Works Department.

ORDER—dated 24th June 1890, No. 351 I., Public Works.

The following revised estimates, aggregating Rs. 38,300, for cutting Kilkuppam East main channel and branch channel No. 3, Barur Tank project, are sanctioned in supersession of the estimates, amounting to Rs. 33,302, previously sanctioned for the

works, the excess of Rs. 4,998 being met from the sources indicated in the foregoing endorsement of the Chief Engineer for Irrigation :—

Capital Expenditure not charged to Revenue.
49. Irrigation.
Barur Tank Project.
I. Works.
(3) Distributaries.
L. Earthwork.

	RS.
1. East main channel	27,600
2. Branch channel No. 3	10,700
Total ...	38,300

2. This sanction has been registered as No. 30 I. of 1890-91.

3. The Examiner of Public Works Accounts is authorised to pass the excess expenditure of Rs. 29 incurred on the accommodation bridge near Chettiyur village.

4. The Superintending Engineer, IV Circle, should submit at an early date, for sanction, a revised estimate for constructing the nineteen masonry falls, the sanctioned provision for which has been reduced from Rs. 4,570 to Rs. 3,435.

(True Extract.)

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation.
„ Superintending Engineer, IV Circle, with enclosures.
„ Examiner, Public Works Accounts.
„ Revenue Department.

IRRIGATION.
ACCOUNT.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated June, 24th.

Recd. *Encl.*

G.O., 24th June 1890, No. 351 I.

JUNE.

Kilkuppam East Main Channel

Estimates aggregating Rs. 38,300, for cutting — and branch channel No. 3, Barur Tank project, sanctioned.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Account.

READ—the following paper :—

From the Superintendent, Government Telegraph Department, Madras Division, to the Secretary to the Government of Madras, Public Works Department, Irrigation Branch, dated Madras, 8th May 1890, No. 733.

In supersession of my letter No. 529, dated the 25th of April 1890, I have the honor to request that the following corrected annual charge for the telephonic system at Trichinopoly may be accepted from the 1st January 1890 :—

	RS.
Wire circuits—	
12·9 miles = 25·8, or say 26 half-miles at 20 Rs.	520
Two telephones at 60 Rs.	120
Total ...	640

Memorandum to Superintending Engineer, VI Circle, dated 16th May 1890, No. VI/12 T.C.
Endorsement of Superintending Engineer, VI Circle, dated 10th June 1890, No. 514 T.C.

ORDER—dated 26th June 1890, No 354 I., Public Works.

The revised charge of Rs. 640 is accepted in supersession of the charge of Rs. 600 accepted in G.O., No. 267 I., dated 12th May 1890.

(True Extract.)

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation.
" Superintending Engineer, VI Circle.
" Examiner, Public Works Accounts.
" Superintendent of Telegraphs, Madras Division.

IRRIGATION.
ACCOUNT.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated June, 26th.

Recd. *Encl.*

G.O., 26th June 1890, No. 354 I.

JUNE.

Telephone System at Trichinopoly

The annual revised charge of Rs. 640 for the —, accepted.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Account.

READ—the following papers :—

From Lieut.-Colonel S. C. CLARKE, R.E., Officiating Superintending Engineer, V Circle, to the Chief Engineer for Irrigation, dated Chepâk, 7th May 1890, No. 620.

I have the honor to report that an estimate was sanctioned in October 1889 for Rs. 4,670 by this office under Repairs ordinary for the reconstruction of a head-sluice on the Narayanaveram river embankment, Chingleput district.

2. The Executive Engineer subsequently reported that there were no funds available under that sub-head and requested that the work might be reclassified under Agricultural Original Works, as there was an available balance of Rs. 1,929. This office unwittingly sanctioned the transfer of debits and altered the sub-head of estimate accordingly. The Examiner has now objected to the estimate being sanctioned by this office as it exceeds the prescribed limit of Rs. 2,500, so that I must ask you to obtain the sanction of the Government to the estimate of Rs. 4,670 of 1889-90 for reconstructing the head-sluice in question under the sub-head of budget, Agricultural Original Major Works.

To the Superintending Engineer, V Circle, dated 9th May 1890, No. V-15 C.N.
From the „ „ V „ „ 11th June 1890, No. 1193.

ENCLOSURE.

REPORT to accompany estimate for reconstructing the head sluice of Perumbedu tank supply channel.

Amount of estimate, Rs. 4,670.

2. The old, badly designed head sluice of Perumbedu tank supply channel was situated in a very awkward position where the Narayanaveram river set against the left embankment, and on account of its being very narrow, the embankment over it could not be made sufficiently strong, in consequence of which there was a breach at this spot annually for the last 3 years. On the 1st November 1888 a breach occurred here again whereby the head sluice was ruined, and the margin between the embankment and the river bed was much eroded; it therefore becomes necessary to reconstruct the head sluice at a fresh site.

3. The sluice is required partly for the purpose of supplying the Perumbedu tank, but also to supply water for 600 acres * of land irrigated by direct flow from the supply channel. The tank itself irrigates 1,030 acres, making a total of 1,630 acres under both tank and channel yielding an ayacut revenue of 7,692 acres.

* Revenue, Rs. 2,750.

4. The tank has a free catchment basin of 4 square miles from which the maximum drainage would be ($D = 500\ M^{\frac{2}{3}}$) 1,260 cubic feet per second, and the capacity of the tank being approximately 84 millions of cubic feet, the maximum rainfall for $18\frac{1}{2}$ hours would suffice to fill the tank, or only half the maximum for 37 hours would suffice. The tank is therefore not dependant solely on the river for its water-supply.

5. The head sluice is designed to have one vent 3′ 0″ × 4′ 0″ (the vent of the old head sluice was 2′ 9″ × 4′ 0″), which with an ordinary flood in the river 10′ 6″ above sill (M.W.L. = 14 feet above sill) would give a discharge of ($D = 5\,A.\ \sqrt{h_1 - h_2} = 5 \times 12 \sqrt{9}$) 180 cubic feet per second and if the tank received no supply whatever from its catchment basin,

10′ 6″ above sill would be only 8′ 6″ above centre of pressure.
∴ Taking $C = \frac{5}{8}$ we get—
$Q = \frac{5}{8} \times 12 \times 8 \cdot 02 \sqrt{8 \cdot 5} = 180$ cubic feet which, however, corresponds with Mr. Taylor's figure.
(Intld.) C. H. B. B.

a most unlikely contingency, this will fill the tank in less than 5½ days. With the old head sluice there was no failure of cultivation for want of sufficient water although the average revenue fell short of the ayacut by Rs. 380. This was due to portion of the low level land being submerged and rendered unfit for cultivation by the efflorescence of salts.*

* Note.—A new sluice has just been completed to drain the water off this land into the river.

6. For the area under direct irrigation by the supply channel a discharge of 16 cubic feet per second is required and this will be secured with a depth of 1′ 8″ of water on the sluice sill.

7. Provision is made in the estimate for excavating a new head to the supply channel to lead up to and from the new head sluice, and also for diverting the river embankment to connect it with the new head sluice, the site for which was selected by the Superintending Engineer.

8. The bottom width of the new cutting for the supply channel head will be 18 feet to make it uniform with the old channel which is only 300 feet below the selected site for the new head sluice. This width is not really necessary.

(Signed) E. TAYLOR,
Supervisor.

31st July 1889.

(Signed) C. H. B. BURLTON,
Executive Engineer, Chingleput Division.

17th August 1889.

No. 89. I.

Submitted to Government.

OOTACAMUND,
20th June 1890.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Acting Secretary to Government,
Public Works Department.

ORDER—dated 26th June 1890, No. 355 I., Public Works.

The following estimate is sanctioned :—

Irrigation.
43. Minor Works and Navigation.
Agricultural Works.
Chingleput Division.
River Embankments.
Original Works.

	RS.
Reconstructing sluice at the head of the Perumbedu tank supply channel on the Narayanaveram river embankment, estimate	4,670

2. This sanction has been registered as No. 31 I. of 1890-91.

(True Extract.)

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation.
" Superintending Engineer, V Circle, with one enclosure.
" Examiner, Public Works Accounts.
" Revenue Department.
" Editors' Table.

IRRIGATION.
ACCOUNT.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated June, 26th.

Recd. *Encl.*

G.O., 26th June 1890, No. 355 I.

JUNE.

Sluice

Estimate of Rs. 4,670 for reconstructing — at the head of the Perumbedu tank supply channel on the Narayanaveram river embankment, sanctioned.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.

READ—the following papers :—

Office note from the Revenue Department, dated 16th November 1889, No. 60.

From Lieutenant-General J. MULLINS, to the Secretary to the Government of Madras, Public Works Department, dated Uphill, Guildford, 17th April 1890.

I have the honor to report, with reference to G.O., No. 515 I., dated 22nd October 1889, the completion of the publication of the Irrigation Manual, and the despatch of 425 copies to your address. I enclose the bill of lading, which reached me yesterday.

2. I have received from the President of the Royal Indian Engineering College, Cooper's Hill, an acknowledgment of the five copies ordered to be sent to him.

3. I received yesterday Messrs. E. and F. N. Spon's account which amounts to £ 528-4-5, and I enclose a copy. I have not disposed of it pending information regarding the particulars of the item of £ 15 for "Re-drawing, re-photographing and mending certain defective plates." It will be seen that the cost of publication and of connected charges will be somewhat less than the amount, £ 550, sanctioned. I think that Messrs. E. and F. N. Spon have done their work in a thoroughly satisfactory manner, and I trust that the Government will approve of the way in which the publishers have performed the duty entrusted to them. I received the first completed copy of the Manual on the 21st March, examined all the passages in which corrections had been made on the proofs and found only two mistakes, which have been noticed in an errata slip. After considerable discussion, a thinner and better paper than that used for the "Dummy" volume was selected, with the result that the Manual is half-an inch less thick and about one pound lighter than the "Dummy."

4. A second copy of the bill of lading will be transmitted by the next mail, and possibly I may then be able to report that Messrs. E. and F. N. Spon's account has been passed for payment. The consignment has, it will be seen from the enclosed correspondence, been insured for £ 600.

5. The publishers notify that five copies have (by law it is presumed) to be sent to the British Museum, and consequently the number of copies remaining with them for sale will be 45 instead of 50, as ordered.

6. In conclusion, I would ask you to convey my acknowledgment to the Government for the confidence implied in their sanctioning the publication of the Manual on their behalf, without the manuscript having been submitted for approval, and I trust that the volume, when examined, will be found to justify their favorable opinion of its probable usefulness.

From Lieutenant-General J. MULLINS, to the Secretary to the Government of Madras, Public Works Department, dated Uphill, Guildford, 24th April 1890.

In continuation of my letter of the 17th instant, I have the honor to enclose a second copy of the bill of lading for the consignment of copies of the Irrigation Manual shipped in the "Golconda."

2. Finding that under the authority given in G.O., No. 515 I., dated 22nd October 1889, the maximum amount in Messrs. E. and F. N. Spon's account which I could pass under publication charges was * £ 509, or £ 3-5-0 less than the amount under this head in their account, I have, after satisfying myself of the propriety of the sum charged by them for redrawing, &c., sundry defective plates, passed their account for £ 524-19-5, including packing, freight and insurance charges, and have recommended the payment also to them, by the Secretary of State, of the small balance of £ 3-5-0.

* $\frac{350}{500} \times 530 + \frac{150}{500} \times 460 = 371 + 138 = 509.$

No. 82 I.

Note by the Chief Engineer for Irrigation.

Inspection of the "Irrigation Manual" proves to the undersigned that he was fully justified in his anticipation that it would be "a work of the greatest value to the Public Works Department, not only of this Presidency but all over India, and that it will prove of use in many ways to other departments whose officers have not infrequently to deal with irrigation works either proposed or in actual existence."

2. General Mullins has carried out his labor of love, for he wishes for no honorarium, in a most thorough manner, and the "Manual" is full of such information and instruction, both theoretical and practical, as the experience of years as head of this branch of the department showed him would be of most use to its members.

3. The work of publication has been satisfactorily executed by Messrs. Spon and Company at a trifling amount in excess of the estimate, viz., £ 3-5-0, which I recommend be at once passed.

OOTACAMUND,
27th May 1890.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Acting Secretary to Government,
Public Works Department.

ORDER—dated 27th June 1890, No. 356 I., Public Works.

The four hundred and twenty-five copies of General Mullins' "Irrigation Manual" received from Messrs. Spon and Company will be distributed as shown in columns 2 and 3 of the statement attached to the note by the Chief Engineer for Irrigation printed with G.O., No. 515 I., dated 22nd October 1889, and of the twenty-five half-bound copies therein entered to be kept in reserve (general), one copy will be supplied to the Revenue Secretariat and two copies to the Board of Revenue; one copy will also be sent to General Sir Arthur Cotton, K.C.S.I. The distribution of the remainder of the general reserve will rest with the Chief Engineer for Irrigation as may from time to time appear advisable.

2. The number * of copies available for sale at Madras will be sent to the Superintendent, Government Press, who will offer them for sale at Rs. 40 a copy in "cloth" and Rs. 42 a copy "half-bound," advertising them in the Fort St. George and the various District Gazettes, in the "*Madras Mail*" and "*Madras Times*" in three

* 100 each half-bound and cloth.

issues, and in "*Indian Engineering*" and "*The Indian Engineer.*" All sale-proceeds will be credited to Provincial miscellaneous revenue.

3. It is observed that as five copies have been supplied to the British Museum Library, the number of copies remaining with Messrs. Spon and Company for sale is only 45.

4. The charges for *publication* have amounted to £512-5-0 or £3-5-0 more than the estimate, but considering the satisfactory way in which the publishers have carried out the duty entrusted to them there is no objection to their being paid in full the charges for publication, viz., £512-5-0. The packing, freight, insurance and incidental charges have been considerably less than anticipated, and up to despatch from England the total cost of the "Manual" has been £21-15-7 less than the estimate; £528-4-5 against £550.

5. The Examiner of Public Works Accounts will, if possible, adjust in the accounts of last official year the expenditure incurred in England on account of the "Manual." If this course is not possible, he will apply for a fresh grant for the current year.

6. Government agrees with the views expressed by the Chief Engineer for Irrigation in his "Note" and thanks General Mullins for the valuable work which he has prepared for it and which it is expected will prove of great use to members not only of the Public Works but also of other departments.

7. Ordered that a copy of these Proceedings, together with a copy of Proceedings of the Madras Government, No. 515 I., dated 22nd October 1889, and two copies of the "Manual" be forwarded to the Government of India for information.

8. The following despatch will be forwarded to the Secretary of State for India.

(Here enter No. 357 I., dated 27th June 1890.)

(True Extract.)

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation.
To General J. Mullins, R.E.
" General Sir Arthur Cotton, K.C.S.I.
To the Superintendent, Government Press.
" Examiner, Public Works Accounts.
" Revenue Department.

ENDORSEMENT—dated 27th June 1890, No. 357 I., Public Works.

Forwarded.

(By Order.)

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

IRRIGATION.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated June, 27th.

Recd. *Encl.*

G.O., 27th June 1890, Nos. 356 I., 357 I.

JUNE.

General Mullins' Irrigation Manual

Forwarding copy of Proceedings distributing copies of —.

PUBLIC WORKS DEPARTMENT.

LETTER—to

THE RIGHT HONORABLE THE SECRETARY OF STATE FOR INDIA.

MY LORD,

In continuation of our despatch No. $\frac{\text{I}}{40 \text{ I.}}$, dated 21st January 1890, we beg to forward herewith, for your Lordship's information, a copy of Proceedings of the Madras Government, No. 356 I., dated 27th June 1890, distributing the copies of General Mullins' Irrigation Manual received from Messrs. Spon and Company and sanctioning the payment to that firm of the full amount of its bill, viz., for publication £ 512-5-0, freight, &c., £ 15-19-5, total £ 528-4-5.

We have the honor to be,
My Lord,
Your Lordship's most obedient, humble servants,

(Signed) CONNEMARA.
(„) C. G. ARBUTHNOT.
(„) H. E. STOKES.
(„) J. H. GARSTIN.

(True Copy.)

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

OOTACAMUND,
27th June 1890.

GOVT. OF MADRAS.

PUBLIC WORKS DEPARTMENT.

(Copy.)

LETTER to the Right Honorable the Secretary of State for India.

No. $\frac{9}{356\ I.}$, dated 27th June 1890.

Forwarding copy of Proceedings distributing copies of General Mullins' Irrigation Manual, and sanctioning payment of £ 528-4-5 to Messrs. Spon and Company for publication, freight, &c., of the Manual.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.

READ—the following paper:—

Petition of Inhabitants of Vavveru, Nellore District, dated 13th June 1890.

No. 91 I.

Note by the Chief Engineer for Irrigation.

The undersigned visited the place and looked into the matter last March, and his views with reference to it are given in clause (*b*) of para. 9 of his inspection notes with Proceedings of the Madras Government, No. 192 I., dated 24th March 1890.

2. The bridge over the head-sluice is close to the village, and though it is only broad enough (7 feet between the parapets) to allow of one bandy passing over at a time, it is so short that this need not cause any real inconvenience if the approaches have 13 feet of clear roadway; as there are solid parapets to the bridge and the approaches where high will have side ridges or fences, there need not be the slightest danger of carts "falling into the channel below."

3. A special bridge would cost Rs. 6,000 or more, the course which the undersigned decided on probably not a tenth of that sum.

4. The Superintending Engineer should, if he has not already attended to the instructions, do so at once.

5. There is a road bridge across the channel 1 mile 990 feet from the head-sluice.

OOTACAMUND,
20th June 1890.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Acting Secretary to Government,
Public Works Department.

ORDER—dated 27th June 1890, No. 360 I., Public Works.

The petitioners are informed that efficient approaches being made to the Eastern channel head-sluice, they will be able to use the bridge over it, and it is not considered necessary to build another bridge across the channel just below that work.

(True Extract.)

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation.
" Superintending Engineer, II Circle.
" Petitioners.

IRRIGATION.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated June, 27th.

Recd. *Encl.*

G.O., 27th June 1890, No. 360 I.

JUNE.

Bridge

Orders on petition of inhabitants of Vavveru, Nellore District, for constructing a — across the Eastern channel of the Sangam anicut system.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.

READ—the following papers :—

Proceedings of the Board of Revenue (Land Revenue), dated 14th May 1890, Mis. No. 3033.

THE HON. J. GROSE.

Read—the following letter from A. T. ARUNDEL, Esq., Collector of the Kistna District, to the Secretary to the Commissioners of Land Revenue, dated 20th March 1890, No. 1923 :—

I have the honor to lay before the Board and Government the urgent claims of the upland taluks of this district for a careful attention to their needs and capabilities in major irrigation works.

2. The delta irrigation under the Bezváda anicut has not unnaturally for many years absorbed almost the whole time and attention of the Superintending Engineer and his staff, and the Board is aware that I have devoted a good deal of care to the zemindari tracts of that area for the last two years with considerable advantage to the revenue, and am therefore not likely to undervalue its importance. The ultimate area to be irrigated in the Kistna delta is 475,000 acres, while the area actually irrigated still falls some thousands of acres short of 400,000. With works estimated and provided for which will eventually add to the irrigated area 80,000 or 90,000 acres, carrying three or four lakhs of rupees water-tax as additional revenue, it is not to be wondered at that the needs of the upland taluks in tanks and anicuts should have escaped attention, with the result that these extensive tracts have been far more neglected than if they had belonged to less fortunate districts.

3. More than twenty-three years ago Mr. Thornhill, when Collector of this district, submitted to the Board a list of some upland irrigation works greatly needed. Of these only one, the Peddakancherla tank in Vinukonda, was ever attempted. It was restored at a cost of Rs. 16,187 and now irrigates 421 acres paying a water-tax of Rs. 1,616.

4. In 1870 Mr. Boswell, then Acting Collector, sent in a further report of works of irrigation needing attention, and it is recorded in Board's Proceedings, No. 1722, dated 14th March 1870. The vicissitudes of one important work in this list, viz., the Dondapad tank in Vinukonda taluk, fed by a stream from the hills with a catchment basin of 40 to 50 square miles, is typical of the neglect I have referred to.

5. In 1868 Colonel (then Lieutenant) C. J. Smith, R.E., made a careful investigation into this project. His estimate for its restoration was Rs. 37,100. It was found that 1,300 acres would be brought under irrigation immediately—the ryots having executed agreements thereto—and that 500 acres more were available. A return of Rs. 5,200 or 14 per cent. on the outlay was to be anticipated almost from the outset.

6. The scheme thus favorably reported on was approved by one Superintending Engineer after another, but nothing was ever done. Once by a kindly fate Rs. 10,000 were allotted to begin the work, but the allotment lapsed, and the ruined reservoir is now in the same condition as it was when Colonel Smith reported on it. A remark in the District Manual led me to visit it early in 1888, and being much struck by its promising character, I obtained the record and early history of it. I of course begged the Superintending Engineer, Mr. Hannan, to visit it, but it was not till the close of 1889 that he was able to do so, and we then went over it together. Mr. Hannan has endeavored to depute a subordinate to revise the plans and estimate and informs me that he hopes this preliminary work will begin at once. The fact remains that this valuable and remunerative irrigation work, approved by a series of Engineers and once even provided with funds to begin repairs, has remained untouched for nearly a quarter of a century since it was formally recommended for restoration.

7. The Vinukonda taluk contains other large schemes which I have not yet personally examined, but *en route* to Palnád occasion was taken to visit a valuable tank at Ipur, which breached thirty years ago and has not been touched since. It has a catchment basin of about 30 square miles, the sluice is in good order, and there are no difficulties about its repair. I hope, if the Superintending Engineer approves the plan and estimate, to take this up as a minor irrigation work, as the nominal ayacut was said to be about 200 acres, much of the water passing away to supply a large tank below which was breached at the same time and so remains.

8. Passing on to the Palnád taluk, another and a far more important work referred to in the Board's Proceedings above quoted is the bunding of the river Naguleru at Mellavagu and the formation of a lake some miles in extent. This scheme was examined and favorably reported on by Colonel C. J. Smith in 1868, but his report is believed to have been lost in transmission to the Superintending Engineer and not to have been placed on record. The river has a catchment basin of about 100 square miles, chiefly in the hills, and never runs dry. A gigantic dam, 60 feet high, was erected by native rulers almost across the narrow gorge in the hills through which the river escapes, and a hill-ridge a mile away was cut down 50 feet with a view to form a calingula. The scheme was never completed. The country from the hills to the river Kistna falls away in a natural slope well adapted to irrigation. At least 4,000 acres of irrigation may be expected from a completion of this project. I have had contours and levels taken in some detail for the work, and the Superintending Engineer arranged to inspect it in March, but other imperative duties consequent on the tour in the delta of the Chief Engineer for Irrigation have prevented Mr. Hannan from carrying out his intention for the present, and I fully recognize and endorse the prior claims on his attention of the important works under execution in the delta.

9. At Atmakúr, in the same taluk, the Vedimangalam river, with a catchment basin equal to that of the Naguleru, passes through an upland ridge at a place that suggests the formation of a considerable lake with less engineering difficulties to contend with than on the Naguleru. The land below is well suited to irrigation.

10. At Macherla is a great ruined tank supplied by the Chendravanka stream which has a catchment area of about 40 square miles. Taking 37 acres of irrigation per square mile of catchment basin—a figure furnished me by Mr. Hannan—and considering the size of the tank, an area of over 1,400 acres should be irrigated. There is a single wide breach in the bund and the principal sluice must be rebuilt; the great calingula is in good order.

11. At Gurazala, or rather at its hamlet of Jangameswarapuram, is a large ruined tank supplied by the Dandivagu, a perennial stream, which has a catchment basin of nearly 50 square miles. The surplus used to supply the Gurazala tank. Another 1,000 acres may be irrigated from this work.

12. The Yerravagu, where it debouches from the hills from a catchment basin of about 12 square miles, can be utilized to form a tank for the irrigation of Guttikonda, and lower down from a total catchment of about 40 square miles can again be utilized to form a tank for the irrigation of Konanki and other villages.

13. Other smaller schemes which I have also inspected might be added, but enough has been said to show the need there is for a careful professional investigation of the capabilities of this single upland taluk of Palnád which I do not pretend to have more than partially examined. It may be noted in passing that the rivers and streams above referred to combine to swell the floods of the river Kistna at a time when it is passing high over the Bezváda anicut. The storage of these waters, if it had any perceptible effect at all on the river Kistna, which is doubtful, would enable the Engineers to add something to the river flow in dry seasons.

14. In the foregoing remarks I have not dwelt on other important schemes which I know to exist in the Vinukonda and Nandigáma taluks and to have been viewed with favor by former Engineers, but of which I have no personal knowledge. The half dozen works that have been specified, if it be found practicable to complete them on remunerative terms, would bring in an additional revenue of half a lakh of rupees or more in water-tax. But this sum means at least two or three times the amount added to the wealth of the people and their means of subsistence. The water-supply on which the works depend is fed from the hills, and is so abundant that a considerable portion of the irrigated area would be permanently protected against famine.

15. It is on these grounds that I venture to urge upon the Board and Government the claims of these taluks to prompt and serious attention without detriment to the more concentrated and remunerative works in the delta. The ryots of the uplands are many of them comparatively poor, they are unprotected from drought and famine, and have little to fall back upon if the rains fail. Means undoubtedly exist, as I have proved in one case and have reason to believe in the others. I have mentioned, by which Government through outlay remunerative to the revenue can afford at least a partial protection, and I think it is unquestionable that such protection ought to be given.

16. If the view I advocate is accepted, it will be for Government to say in what way the schemes I have put forward and others of equal value may best be examined, and if approved, carried into execution. The formation of a Tank Investigating and Restoration Party to this district would no doubt be the best plan, for it is obviously impossible for the Superintending Engineer to give the time and attention necessary for the undertaking. If no party is immediately available, I would urge that "a temporary establishment" be employed similar to that which "has been placed at the disposal of the Executive Engineers of the Godávari Eastern and Western Divisions for the investigation of the requirements of the tanks of the Godávari district" as noted in the Administration Report, Public Works Department, Irrigation, 1888-89, page 67. I beg leave to request the support of the Board to this course as the minimum that should be sanctioned, and would urge that a complete Tank Restoration Party should follow as soon as practicable.

Resolution—dated 14th May 1890, Mis. No. 3033.

Submitted to Government. The Board supports Mr. Arundel's proposals and hopes that at an early date the Government will be able to order a re-examination of the various irrigation projects alluded to.

(True Extract.)

(Signed) M. HAMMICK,
Secretary.

No. 3543, Revenue.

Transferred to the Public Works Department.

OOTACAMUND,
10th June 1890.

(Signed) C. A. GALTON,
Secretary to Government.

No. 92 I.

Note by the Chief Engineer for Irrigation.

With reference to Resolution of the Board of Revenue, Mis. No. 3033, dated 14th May 1890, received with endorsement No. 3543, dated 10th June 1890, of the Revenue Secretary, the Western Division, Kistna, has upwards of $5\frac{1}{2}$ lakhs to spend on works in the current official year, and none of the staff sanctioned for the division can be diverted from what it has to do in utilizing the grants, to the investigations suggested by the Collector.

2. The arrangements connected with the Tank Restoration Scheme in the current official year have already been made * and I would not advocate their being altered, but in next official year a party such as those now working under the Godávari Executive Engineers may be provided to work under the direction of Executive Engineer, Kistna Western Division.

* See Proceedings, Madras Government, No. 296 I., dated 22nd May 1890.

OOTACAMUND,
14th June 1890.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Acting Secretary to Government,
Public Works Department.

ORDER—dated 30th June 1890, No. 363 I., Public Works.

The Government considers the suggestions of the Collector of Kistna to be of great importance and directs that next year a Tank Restoration Investigation Party shall be sent to work in the upland taluks of the Kistna district, whilst for the investigation of such of the schemes mentioned by Mr. Arundel as lie outside the scope of the ordinary tank restoration operations and as seem most promising, an Assistant Engineer, with the necessary establishment, will be placed at the disposal of the Superintending Engineer, II Circle, as soon as available, which will probably be in October next.

(True Extract.)

(Signed) G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

To the Superintending Engineer, II Circle.
„ Chief Engineer for Irrigation.
„ Chief Engineer, General Branch.
„ Examiner, Public Works Accounts.
„ Revenue Department.

IRRIGATION.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated June, 30th.

Recd. *Encl.*

G.O., 30th June 1890, No. 363 I.

JUNE.

Irrigation Works in the Kistna District

Passing orders on the suggestions of the Collector for the investigation of certain —.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

TABULAR STATEMENT OF MISCELLANEOUS PROCEEDINGS AND MATTERS OF ROUTINE,

IRRIGATION,

FOR THE MONTH OF JUNE 1890.

Subjects.	Number and Date of Order.	Numbers and Dates of previous Orders.
Channels in Karúr taluk.—Proceedings, Revenue Department, approving with remarks, the establishment proposed by the Collector for the management of certain —.	3rd June 1890, No. 311 I.	8th Feb. 1888, No. 101 I. 17th June 1879, No. 349 I. 4th April 1884, No. 924 W. 4th March 1889, No. 118 I. 27th Jan. 1888, No. 375 C. 14th April 1888, No. 1569 C. 24th Feb. 1888, No. 133 I.
Revenue Report of the Irrigation Branch of the North-Western Provinces and Oudh.—Copy of the —, communicated to the Chief Engineer for Irrigation.	3rd do. do. No. 312 I.	......
Salt.—Proceedings, Revenue Department, requesting to appoint a Public Works officer to inspect the platforms for the storage of — at Ennore, and to afford the Commissioner advice and assistance.	9th do. do. No. 320 I.	......
Proceedings of the Board of Revenue.—Proceedings, Revenue Department, intimating the transfer of certain — to the Public Works Department, Irrigation Branch, recorded with reference to No. 2291 C., dated 17th May 1890.	9th do. do. No. 321 I.	......
Land.—Proceedings, Local and Municipal Department, recording letter from the Collector of Kistna stating that the Municipal Council, Bezváda will not allot any more land until the proposal for widening the Ryves canal have been disposed of —, recorded.	10th do. do. No. 322 I.	18th Feb. 1890, No. 104 I.

Subjects.	Number and Date of Order.	Numbers and Dates of previous Orders.
Agra Canal Atlas.—Letter from the Government, North-Western Provinces and Oudh, acknowledging two copies of the —, recorded.	12th June 1890, No. 325 I.	......
Programme of Tank Restoration Works.—Proceedings, Revenue Department, approving the — to be done next year, recorded.	20th do. do. No. 338 I.	21st May 1887, No. 1384 W. 2nd Sept. 1887, No. 2360 W.
Erratum in G.O., No. 263 I., dated 2nd May 1890.	20th do. do. No. 339 I.	......
Copy of the above, forwarded to the Government of India.	20th do. do. No. 340 I.	......
Erratum in G.O., No. 301 I., dated 23rd May 1890.	21st do. do. No. 342 I.	......
Copy of the above forwarded to the Government of India.	21st do. do. No. 343 I.	......
Drainage of deltas in Bengal.—The Government of Bengal requested to furnish printed copies of any notes or information on the —.	24th do. do. No. 344 I.	......
Statement of objectionable items.—Orders on —, No. I Periyárd ivision, for period ending 31st March 1890.	24th do. do. No. 345 I.	......
Statement of objectionable items.—Orders on —, I Circle, for period ending 31st March 1890.	24th do. do. No. 346 I.	1st March 1890, No. 129 I.
Statement of objectionable items.—Orders on —, II Circle, for period ending 31st March 1890.	24th do. do. No 347 I.	18th Marh 1890, No. 179 I.
Statement of objectionable items.—Orders on —, III Circle, for period ending 31st March 1890.	24th do. do. No. 348 I.	21st May 1890, No. 291 I.
Statement of objectionable items.—Orders on —, V Circle, for period ending 31st March 1890.	24th do. do. No. 349 I.	28th May 1890, No. 306 I.
Canal plantations.—Letter from the Public Works Department, North-Western Provinces and Oudh, forwarding copies of the report on — for year ending 31st March 1889, recorded.	26th do. do. No. 352 I.	......
Tank Restoration Scheme.—Endorsement of the Government of India requesting reply to letter asking to be furnished with the portion of outlay on investigation due to individual works or even groups of works under the —, recorded with reference to No. 327 I., dated 14th June 1890.	26th do. do. No. 353 I.	......
Telegraphic warnings of storms.—Ordered that the Government of India be requested to send to the Executive Engineer, Godávari Eastern division, instead of to the Superintending Engineer, I Circle, — likely to cross the coast north of Masulipatam.	27th do. do. No. 358 I.	......
Government of India requested accordingly.	27th do. do. No. 359 I.	......

Subjects.	Number and Date of Order.	Numbers and Dates of previous Orders.
Revenue Report of Irrigation Works in Sind for 1888-89.—Resolution of the Government of India on the —, communicated to Superintending Engineers, I, II, III and IV Circles and the Chief Engineer, Periyár Project, for information.	27th June 1890, No. 361 I.	......
Mr. Abdur Ruzzack, clerk, Public Works Secretariat; Irrigation Branch.—The admission of the authorized travelling allowance to the family of — from Madras to Ootacamund, sanctioned.	27th do. do. No. 362 I.	......